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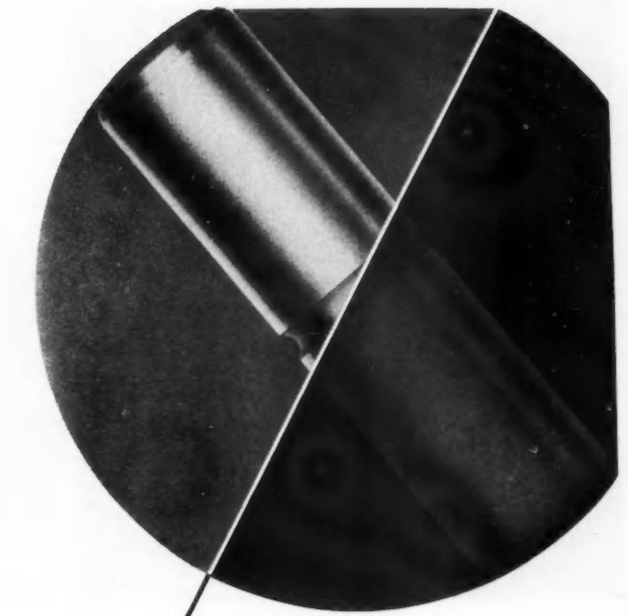

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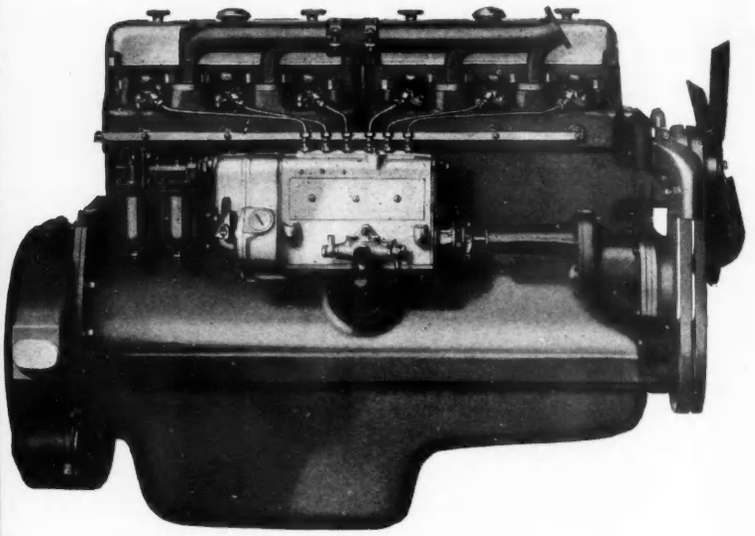


A Modern Automotive Diesel

The Waukesha Comet Diesel is an airless injection, four cycle, compression ignition engine. Three sizes—100 hp. to 140 hp., just right in size and weight for heavy duty automotive service.

Patented Combustion Chamber Design

The "comet" combustion chamber was designed and patented by Ricardo. It is a separate insert, surrounded by an insulating space, and has a high heat-holding capacity. It is spherical in shape for compactness of form and to secure a maximum air movement or turbulence within the chamber itself. As a result, the engine runs with a clear exhaust and a greater smoothness than any other type of automotive Diesel.

THIS IS No. 6 OF A SERIES on the Comet Diesel. A reprint of the complete series will be mailed on request.

Burns Cheap Diesel Fuels

No special fuel oils are needed. The Comet Diesel burns all fuels that any other high-speed Diesel will burn. It is designed to use the widest possible range of Diesel fuel specifications—any of those commonly found in the open market.

Easy Starting

No gasoline priming is needed to start the Comet Diesel. It starts "cold" and it starts promptly, even in zero weather. It comes up to operating temperature quickly due to its heat insulated combustion chamber.

Aluminum Pistons

—most essential in modern high-speed automotive service are standard equipment. Their use is ample proof that destructive temperatures do not exist in the Comet Diesel.

Write for Bulletin 957. *Waukesha Motor Company, Waukesha, Wisconsin.*

WAUKESHA ENGINES

AUTOMOTIVE INDUSTRIES

Vol. 72, No. 23 ▫ THIRTY-SEVENTH YEAR ▫ June 8, 1935

June Output May Hit 400,000

Retail Sales Stage Strong Come-Back at Close of May

by Harold E. Gronseth
Detroit News Editor, Automotive Industries

Retail sales of motor vehicles staged a strong come-back in the last half of May after exhibiting slackening tendencies during the early part of the month. The improvement was general and brought the May volume of a number of companies practically to the peak reached in April while a few forged ahead to set new highs for the year.

Since the period covered by the figures includes only a few days of operation without the code it is not likely that sales thus far reported have been materially influenced by lifting the code restrictions. It will be necessary to have figures for the next reporting period to determine what effect the letting down of the bars on used car allowances will have on new car sales.

Continued strong retail demand will assure a better operating rate for June than was anticipated by the motor companies. While many are planning seasonal curtailment and have set schedules under the probable sales for the month in order to cut down field stocks, a considerable portion of the slack will be made up by the sharp advance in Chevrolet's production following resumption of operations after its strike troubles. The company recently announced that its production would continue at peak schedules throughout June and probably longer.

According to present plans of manufacturers, the industry's June production should not fall far short of the 400,000 mark, bringing the first six months output to around 2,400,000 cars and trucks which compares with 1,797,935 units turned out in first half of 1934. As nearly as can be estimated at this time, May domestic retail sales totaled roughly 325,000 cars and trucks which compares with registrations of 366,437 units in April this year and 259,956 units in May last year.

Buick

May retail deliveries of Buick cars were the largest for any month this year and exceeded any May since 1931. Sharp increases in the last 10 days of the month brought the total May deliveries to 7627 units which compares with 5245 in May,

(*Turn to page 756, please*)

Ricardo Suit Dismissed by Court of Appeals

On the appeal of the Waukesha Motor Company against the Willys-Overland Company, defended by the Automobile Manufacturers Association, the Court of Appeals at Cincinnati delivered its decision Thursday affirming the previous decision of the District Court at Toledo, dismissing the infringement suit on the Ricardo Combustion Chamber patent, No. 1,474,003, against the Willys-Overland Company.

This decision is an outcome of long-pending litigation defended by the Association in a case brought against the Cleveland Automobile Company in 1924 and withdrawn by the plaintiff and in a second case against the Willys-Overland Company in 1928.

New Hudson Country Club Sedan Priced at $880

A new sedan known as the Country Club model mounted on a 124-in. wheelbase chassis is announced today by the Hudson Motor Car Company. The car, which is priced at $880 f.o.b. Detroit, sets a new record in that it is the first time that a car of this size and power has carried a list price under $1,000.

APEM Directors Vote to Continue Organization as Trade Association

Their duties as a code authority ended by the NRA decision, the directors of the Automotive Parts & Equipment Manufacturers, Inc., voted at a meeting held in Detroit on Wednesday of this week to continue the organization as a trade association. The organization has 425 members employing 93 per cent of the workers on the payrolls of the approximately 830 companies coming within the code definition of the industry.

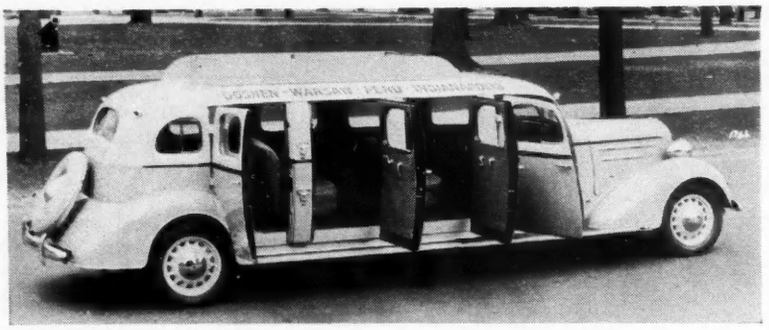
Calling attention to the fact that regulation of industry is now handed back to industry itself, the directors declared that industry can acquit itself of the vicious charges made against it by its enemies, or by its own action, can convict itself of those practices indulged in by only a small minority. Continuing, the directors urged all members of the parts and equipment industry to cooperate in maintaining fair standards of wages, hours and working conditions, and, through voluntary action to eliminate unfair methods of competition.

For the present, the directors recommended that employers continue to comply with the principles of the APEM code; that they bulletin employees that no change in wages or hours is anticipated; that members continue to file wage and hour reports every four weeks, that members continue to report sales figures, and that the former Code Authority Committee be continued and recognized as the Administrative Committee of Fair Trade Practice.

The activities which the APEM proposes to continue as a trade association are described as follows:

1. Keep an accurate record of every member of this industry.
2. The compilation of wage and hour reports and the distribution of compiled information to the industry as a whole and to specialized groups of competitors, as has been our recent practice.
3. The compilation of wages by classifications of labor so that the members of this industry may know the rates of pay, for the

(*Turn to page 756, please*)



Eleven-passenger Chevrolet-sedan bus built from a Chevrolet Master sedan by the Fitzjohn Body Co. of Muskegon, Mich., by cutting the frame and body and lengthening them, providing special coils in the front springs and special rear springs. Most of the body parts used for the extension are said to be Chevrolet stock parts, so that they can be serviced by Chevrolet dealers.

White Strike Settlement Seen as Creating Permanently Harmonious Labor Relations

Described as one of the most unusual walkouts in all American industrial history, the White strike, the end of which was reported last week in *Automotive Industries*, was characterized by a complete lack of violence, a minimum of ill feeling and a rational attitude on both sides. While the terms of the settlement have not been revealed, it is believed that they provide a basis for permanently harmonious labor relations.

Trouble had been brewing at the plant for a considerable period and came to a head immediately following the assumption of the presidency of the company by Robert F. Black on May 1. Following negotiations the men walked out quietly on May 8 after protecting their machines and work in process which in itself was striking evidence of their attitude. There was no disturbance nor did the men loiter at the gates.

Picketing commenced the next day but to avoid any possible chance of violence, the company established temporary headquarters downtown from which the business was administered during the strike. On the first day of picketing Mr. Black, chatting with the men and noticing their lack of anything to do since both plant and offices were closed, offered to buy baseball equipment. This offer was promptly accepted and games were played on the plant parking lot.

After three days of picketing, the pickets applied to the watchmen for brooms, shovels and rubbish carts for use in cleaning up litter on the sidewalks.

Early in the strike, a full page advertisement entitled "No One Ever Wins A War Or A Strike" and signed by Mr. Black appeared in the Cleveland papers. Its tone was conciliatory, but it indicated clearly that the management insisted on a settlement that would be permanent. Daily, during the strike, bulletins were sent to all White branches, distributors and dealers, accompanied by clippings from the local newspapers, so that the selling organization would have complete and up-to-date information.

These bulletins are regarded as at least partially responsible for the fact that orders during the week of the strike exceeded any previous week in 1935. Emergency plans for handling service parts functioned smoothly.

The vote to strike was 1,300 to 67, while when the vote to return to work was taken there were only five dissenting votes. Commenting on this result, the company says that: "When labor and management can meet on common ground, commonsense can solve their difficulties and there are no wounds to heal. No unpleasantness to be forgotten. There are neither vanquished nor conquerors. Misunderstandings of the past have made it possible to reach a basis of mutual confidence which has laid a firm foundation on which we can build permanently harmonious relations."

Ford to Spend $2,000,000 on Power House Equipment

New power house equipment costing approximately $2,000,000 is to be installed by the Ford Motor Co. of Canada, Ltd. and its East Windsor, Ont., plant, according to Wallace R. Campbell, president of the company. Bids for the new equipment already have been asked.

The program calls for three turbo-generators, one of 20,000 kw., one of 5,000 kw. and the third of 750 kw. rating, and two boilers of a type not previously used in Canada, generating steam at 900 lbs. pressure, producing 180,000 lbs. of steam per hour.

Graham Uses Gas Mileage Tests in Sales Campaign

Gasoline mileage results obtained in a series of "average driver" tests with the Graham six touring sedan will be the basis for an aggressive merchandising campaign by the Graham Paige Motors Corporation during the late spring and early summer weeks, according to F. R. Valpey, vice-president and general sales manager.

The results ranged from 24.3 miles per gallon in Reno, California to 30 miles per gallon in San Francisco. A standard grade of gasoline was used in cooperation with a leading oil company and the tests were checked by experienced observers—automobile editors, city officials and highway patrolmen.

GM Building McCook Plant

Erection of the world's largest all-welded steel industrial plant has been started at McCook, Ill., by the Electro-Motive Corp., a General Motors subsidiary. Diesel locomotives will be manufactured exclusively.

Medium Priced Cars Make Biggest Gain In First Four Months; Increase is 78%

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)
Four Months 1935 and 1934 Compared

	1935	1934	Per cent change	Per cent of Total 1935	Per cent of Total 1934
$500 and under	813,868	588,853	+ 38.21	61.22	64.93
$501-$750	469,920	263,879	+ 78.08	35.35	29.09
$751-$1,000	29,861	32,990	— 9.49	2.25	3.64
$1,000-$1,500	9,302	13,147	— 29.25	.70	1.45
$1,501-$2,000	3,193	4,024	— 20.65	.24	.44
$2,001-$3,000	1,959	3,051	— 35.79	.15	.34
$3,001 and over	1,216	983	+ 23.70	.09	.11
Total	1,329,319	906,927	+ 46.57	100.00	100.00

Truck Production by Capacities

(U. S. and Canada)
Four Months 1935 and 1934 Compared

	1935	1934	Per cent change	Per cent of Total 1935	Per cent of Total 1934
1½ tons and less	266,220	203,411	+ 30.87	94.55	93.13
2 to 3 tons	12,002	12,686	— 5.40	4.26	5.81
3½ tons and over	2,247	1,780	+ 26.23	.80	.81
Special and buses	1,095	545	+100.92	.39	.25
Total	281,564	218,422	+ 28.91	100.00	100.00

Four Cylinder Engines Predominate In Indianapolis Race; New Records Set

by Bill Tobolt
Technical Editor, Automobile Trade Journal

With the first 10 to receive the checkered flag at the annual 500 mile race at Indianapolis averaging better than 100 m.p.h. and the winner, Kelly Petillo setting a new track record of 106.240 m.p.h., future racers have their work cut out for them. In addition to Kelly, Wilbur Shaw and Wild Bill Cummings, who finished second and third respectively, also averaged speeds higher than the former record of 104.863 m.p.h., set by Bill Cummings in 1934.

Of particular interest is the fact that all the first 10 cars to finish were powered with Miller race engines, and all of these were four-cylinder units, with the exception of Ralph Hepburn's Veedol Special and the Milac Front-Drive Special driven by Chet Miller, which were powered with Miller straight eight engines.

The semi-stock cars, which have given such a good account of themselves in previous Indianapolis races, were not so successful as in the past. This probably is attributable to lack of sufficient time in preparing the cars for the gruelling 500-mile contest.

Of the four Ford V-8 Specials, entered by Harry Miller, which qualified for the race, three went out because of steering-gear seizure and the fourth developed bearing trouble during the 114th lap because of insufficient oil. It was generally believed that more of these revamped Fords would have qualified if more time had been available, as at least four of these cars were lined up waiting their turn for qualifying runs when the time limit expired.

Two accidents marred the early laps of the race. Weatherley, driving the same car in which Johnny Hannon was killed in practice, hit the northwest wall in his eighth lap. Weatherley died immediately, and his riding mechanic suffered a broken back. In the 16th lap, Al Gordon, driving the Cocktail Hour Cigarette Special, also hit the wall but escaped with minor bruises.

In view of the fact that the caution flag was out immediately after these accidents, and again later for 13 laps because of rain, the new record is particularly noteworthy. Had it not been necessary to slow up the field to approximately 75 m.p.h. during these two periods, the final average would have been in the neighborhood of 109 m.p.h.

The order of finish, the speeds and causes of withdrawal are listed elsewhere in this report. Rex Mays, piloting the Gilmore Special, led the pack for nearly 200 miles, then broke a connecting rod and relinquished the lead to Petillo in another Gilmore Special. Louie Meyer who climbed from ninth place up to third at the half-way mark, developed engine trouble, which reduced his speed to such an extent that he did not show up among the first 10 at the finish. Wilbur Shaw in a Pirrung Special came up from sixth place at the 100 mile mark to first at 350 miles, only to drop behind Kelly's Gilmore Special. However, only 40 seconds separated Shaw from Petillo at the finish.

A careful study of the cars entered in the race showed that the race drivers when selecting a car to enter in the race are again returning to the highly specialized racing engine. For the most part the four-cylinder Miller had the preference. Of course, Russel Snowberger with his Studebaker-engined job and Phil Shafer with his three revamped Buicks as well as some of the other entrants again elected to enter stock-engined jobs. But it is interesting to note that while Snowberger entered his Studebaker-engined job, known as the Blue Prelude Special, he drove a Boyle-Products Special powered with a Miller four-cylinder engine.

If it had not been for the team of ten Ford-engined cars entered by Harry Miller, the semi-stock jobs would have been conspicuous by their absence. These cars were undoubtedly among the most interesting in the race and the fact that current rumors had it that they had the backing of the Ford factory did not reduce the interest.

These Ford V-8 Specials not only were of the front-drive type but also had independent suspension at both front and rear. Two quarter-elliptic springs, mounted side by side, were used at each wheel. Springs were enclosed in a streamlined housing which contributed materially to the fine streamlined appearance of these cars. A full description of the Ford cars appeared in last week's issue of *Automotive Industries.*

Kelly Petillo
Winner of this year's Memorial Day Classic with a speed of 106.240 m.p.h.

The extent to which race drivers employ factory parts is shown by the Gilmore Special driven by Kelly Petillo. This car, powered with a 262.4 cu. in. four-cylinder Miller engine, used a Plymouth front axle and a Studebaker transmission. Incidentally, Kelly set a new track record when attempting to qualify. The record was not allowed, as he exceeded the fuel requirements. The car with which Kelly held the pole position last year, was driven in this year's race by Babe Stapp.

While the majority of clutches are of the multiple disk type, they were specially built and utilized 21 to 23 Ford clutch plates from which the lining had been removed. Ford truck clutch springs were also favored.

Rex May's Gilmore Special, which held the pole position, was the largest four-cylinder Miller engine in the race, having a displacement of 269 cu. in. The 16-cylinder engine used by Alden Sampson, and which was driven by Louie Meyer in a number of previous races, was replaced by a four-cylinder Miller engine.

Bill Cummings drove the same car which he drove to victory last year. Lou Moore's engine had the distinction of having finished in third place on two previous occasions, while Tony Gulatto's Bowes Seal Fast Special, owned by Leon Duray, finished in second place in two consecutive years.

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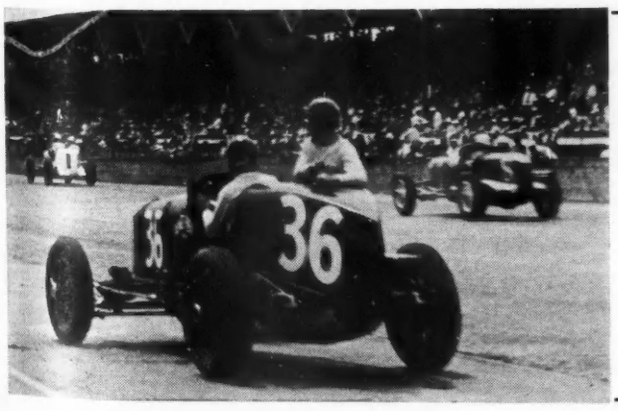


A view of the Indianapolis Speedway on Memorial while the race was in progress.

Skeletonized NRA, Wagner Bill Passage Sought by President in "Stop-Gap" Move

A skeletonized NRA, an NRA stripped of all its basic powers held unconstitutional by the Supreme Court, was developed this week by President Roosevelt and New Deal leaders and prepared for enactment by Congress. Cloaked in the form of a "stop-gap" program, and embodied in the Clark Resolution recently passed by the Senate, NRA would be continued principally as a fact finding organization until April 1, 1936.

Administration leaders have assured the President such a program can easily be put through the Congress. As described by the President NRA in this form would have two responsibilities: (1) to group and condense general business information gathered during the last two years and to observe and report on the operations of industries under codes and those not codified; (2) to enforce a proposed law requiring all contractors supply material to the government to comply with labor provisions under a legal yardstick which will parallel closely the provisions of the inoperative codes in so far as they relate to minimum wages and maximum work hours.

The outline of NRA's future form was sketched by the Chief Executive at a press conference held early in the week and at which he read a detailed statement covering the present situation. While he specifically did not ask enactment of the Wagner Labor Disputes Bill, the President clearly indicated that he desired favorable action on the measure when, at the close of his statement, he said: "The Wagner Bill, if enacted, would set up new tribunals which would substantially cover functions heretofore exercised by the various boards above mentioned." These boards are the seven created by NRA and incapacitated by the Supreme Court's ruling. They are the National Labor Relations Board, the Petroleum Labor Relations Board; Steel Labor Relations Board, Textile Labor Relations Board, Work Assignment Board for Cotton, Work Assignment Board for Silk and the Work Assignment Board for Wool.

Since Washington reports have given the Automobile Labor Board not much longer to live, the future of bargaining agencies apparently rests with whatever action is taken by the workers and the cooperation of the managements.

Indications are that attempts will be made by the various agencies which have been set up to carry on, but the success of such a movement will depend on the leadership shown on both sides. The objective of labor leaders affiliated with the bargaining agencies is to weld various groups into one big labor organization for the motor industry, but chances of success are conceded by some of the promoters to be slender. The principal obstacle is felt to be a lack of cooperation on the part of the leaders, some of whom are more concerned about their own welfare than that of the organization.

Observers in the industry expect the Wagner bill to be passed by Congress as a gesture to labor, probably causing some unsettlement, but they have little faith in the Bill becoming operative as it is considered highly probable that it will be tied up in the courts.

Immediately after the President's announcement of his program to continue NRA in skeleton form the House and the Senate set in motion the necessary machinery to pass the legislation. An opinion has become prevalent in Washington that only the "stop-gap" legislation will be asked at this time and that the long range program by which Mr. Roosevelt proposes to bring the country back from the "horse and buggy days" to which he said the Supreme Court's decision relegated it, and which may entail a constitutional amendment, must go over to another year. It has been indicated there may be further legislation at this session of Congress, but only if the President deemed it necessary to prevent an outbreak of serious labor troubles or other occurrences that might disturb the country while the permanent New Deal program is being worked out.

Mid-week indications were that the House would make short work of passing the Clark Resolution with the necessary amendments and Senate leaders could see no objections looming which would hold up passage in that wing of Congress.

Some of the 51 executives and dealers of the Ford Motor Co. of France S. A., Asnieres, France, who arrived in this country aboard the S.S. Normandie on her maiden voyage. The party was headed by Maurice Dollfus, managing director of the Ford Co. of France. M. Dollfus is in the right foreground standing at the left of Madame Dollfus. Others in the picture, made aboard ship are E. Mathis, chairman of Matford; Paul Iribe, noted French artist; Louis Carle, director of Ford of France and J. C. Charpentier, director of Ford of France and Matford.

French Ford Dealers Come on Normandie, Visit Plant

The Ford Motor Company was host Wednesday to a party of 45 Ford dealers from France and a group of executives of the French Ford organization who had come to America on the maiden voyage of the S.S. Normandie, receiving the trip as a reward from the French company, Matford, S.A.F. Among the executives in the party were Maurice Dollfus, managing director of Matford, and M. Mathis, French automobile manufacturer, whose interests are now amalgamated with those of Ford in France.

At the welcoming ceremonies in the Ford engineering laboratory the visitors presented Henry Ford with a Ford V-8, built in France of French parts, which had been brought over by the party. After a tour of the Ford plants and Greenfield Village the party was split into five groups, each group visiting a Detroit Ford dealership. A tour also was made of the decentralized Ford plants in small Michigan cities.

May Production 9% Higher Than Year Ago, AMA Reports

Motor vehicle production for May, 1935, amounted to 380,419 as compared with 350,616 a year ago, an increase of approximately 9 per cent, but a loss from April of this year of about 24 per cent, according to estimates just released by the Automobile Manufacturers Association. This large decrease in production can be partly attributed to the Toledo strike which prevailed throughout the first part of the month.

Detail figures are as follows:

Motor Vehicle Production—U. S. & Canada	
May, 1935	377,754
April, 1935	501,837
May, 1934	350,616
5 Mos., '35	1,988,637
5 Mos., '34	1,475,965

	Per Cent Change
May, '35 over '34	+8.6
May, '35 over April, '34	—24.0
5 Mos., '35 over '34	+35.0

Compulsory Safety Glass Bill Passes Ill. House

The Illinois house has passed a bill compelling the use of safety glass in all automobiles or motor trucks used on the state highways of Illinois.

Millionth Pontiac Off Assembly Line

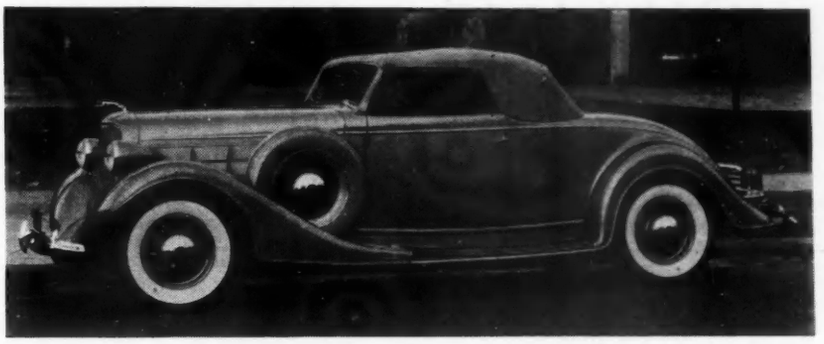
City Plans Celebration With Parade and Luncheon to Knudsen and Klingler

The Pontiac Motor Co. has completed manufacture of its first million cars. In honor of the achievement, the City of Pontiac has announced a civic celebration for June 12. H. J. Klingler, Pontiac president, will present the one millionth car to the Community Chest.

Wednesday's celebration will include a luncheon sponsored by the Board of Commerce at which W. S. Knudsen, GM executive vice-president, will be guest of honor. Following the luncheon Mr. Knudsen will ride with Mr. Klingler in a parade featuring the honor car. A car from each year's production will be in line with 200 of the current models. The first Pontiac ever built, running under its own power, will be a feature of the parade.

More than 300 factory employees who helped build that first Pontiac still are on the company payroll and helped build number 1,000,000. Some $86,000,000 have been paid in wages by the company during the nine and a half years since the first car was built, in addition to many more millions paid to thousands of employees of the Pontiac Fisher body plant. One million cars have meant that approximately 5000 people have been kept on the active payroll of the company.

From 3 to 8 o'clock Wednesday, Pontiac will hold open house for visitors.



This sleek convertible roadster is by LeBaron on the 150 horsepower Lincoln V-12 chassis. The top folds easily into a recess behind the front seat. A rumble seat, roomy and comfortable, is housed in the long rear deck. A roomy compartment, ideal for golf clubs or parcels, is reached by a curb-side door. Additional accommodation for luggage is provided by a folding trunk rack at the rear.

Used Car Control Under FTC Believed Possible

Certain dealer elements appear to have some confidence that the code principles as applied to used car control can be continued under Federal Trade Commission supervision. It is understood that reactions to the proposal on the part of certain Washington officials has been favorable and that further exploration is under way.

Some consideration also is being given to the possibility of securing the cooperation of finance companies in establishing average used car values in a guide book. The thought behind this is that the finance companies would set the values at 150 per cent of the amount of money they would be willing to advance on the individual model when it is sold at retail.

Toledo Edison Co. Strike Endangered Motor Plants

The ability of the Toledo Edison Co. to maintain normal service averted a tie-up of power sources for automotive parts plants in the city when electrical workers walked out early Wednesday. The strikers voted to return to work before the strike was 24 hours old.

Faced with a possible power stoppage the Electric Auto-Lite Co. closed for the day. Virtually all the other big parts plants including Libbey-Owens-Ford, Champion Spark Plug Co., Spicer Manufacturing Corp., Chevrolet, City Auto Stamping, Mather Spring and Willys-Overland would have been thrown out of operation by a power failure.

The electrical workers voted 237 to 22 to return to work immediately and arbitrate wage differences. The men asked a 20 per cent increase, although last year wages at the Edison Co. were restored to the 1929 peak hourly rates. The company refused to grant the increase, but promised no loss in pay due to the one day strike.

Reo Names Motor de Luxe as French Distributor

Reo Motor Car Company's passenger cars, speed wagons, buses and heavy duty trucks are to be distributed and serviced in France by Motor de Luxe, well known automotive distributing organization with display rooms at 12 Rue de Berri, Champs-Elysees, Paris. Modern service facilities are provided at Portes Mallot & Ternes.

Sh! Sh! Congress Detects a Lobby

A few short weeks ago nearly 75 per cent of The People's representatives in Congress voted for the Patman inflationary bonus bill and an overwhelming majority in the Senate did their best to make the Wagner bill a law. On Thursday of this week an investigating committee of the House haled before it Colonel Clarence O. Sherrill, president of the American Retail Federation, whose recently formed organization of national retail associations had been "whereasingly" described by House Resolution 203 as a body whose purpose is "by propaganda and other methods inimical to the public welfare, to attempt to control and influence the Congress of the United States in its legislative deliberations."

The purity and independence of our Congressional deliberations must be maintained.

Enjoin Andrews Group From Further Suits

Meetings, Representation Claims, Interference With Business Barred by Judge

Another blow to the Andrews faction in the controversy over control of Hupp Motor Car Corp. was dealt Tuesday when Federal Judge Edward J. Moinet issued a temporary injunction restraining Archie M. Andrews, former chairman, and members of the old board from beginning or prosecuting any other suits or actions in the Detroit or any other jurisdiction in relation to various matters listed by the plaintiffs, members of the new board agreed upon in the compromise settlement of J. Walter Drake's suit to oust Andrews from control.

The order also enjoined the defendants from holding further meetings as Hupp directors; from claiming they are directors of the corporation; from asserting that Archie M. Andrews is chairman of the board; from claiming that the new board does not consist of legally elected directors; from interfering with the business of the corporation; from taking any action that will prevent the company's disposing of any of its property, particularly the real estate owned by it in Cleveland; from issuing statements to Hupp dealers, particularly in connection with the contract between Hupp and the Seminole Paper Co., and from declaring that the new directors have not in all respects carried out the agreement made with Mr. Andrews, his counsel, George Schein and Joseph L. Cohen, and with Judge Moinet.

Hearings to show cause when the injunction should not be made permanent were set for June 13. The defendants are Archie M. Andrews, Frederick Cardway, Emlen S. Hare, Walton C. Fitzgerald, John McGrath, Frank S. Lewis, Thomas Bracken, Frederick Dodge, George L. Schein, Louis J. Cohen, W. M. Donnelly, Stanley Osserman, Harold Strauss and A. W. Lowenthal.

Kathleen Webber Rumley

Mrs. Kathleen Webber Rumley, wife of Vincent P. Rumley of the Hudson Motor Car Co. died suddenly Monday at the family cottage in Gaylord, Mich.,

NADA Leaders Discuss NRA Replacement Program, Factory-Dealer Relationships

A program to replace the dealer code knocked out by the recent Supreme Court decision on NRA and discussion of a brief on factory-dealer relationships consumed the major portion of the two-day meeting of NADA directors in St. Louis May 31 and June 1. The meeting failed to evolve anything of a specific program to replace the code, despite the fact that directors attending the meeting and representing nearly all the states of the country insisted they must have "something to take home to the dealers." What there was of a program lacked unity, coherence and force.

A considerable portion of the session was devoted to consideration of the "brief" which NADA first presented to the AMA and later to individual car manufacturers. The brief sets forth the "dealers' major objectives in relationship with the automobile manufacturers" and makes specific recommendations for changes in existing factory dealer contracts concerning: cancellation, used car allowances, consignment, new car prices, fleet discount, obsolete and discontinued models, gross margins, discounts, accessories and special charges, sales territory protection and time payment sales. Details of these recommendations are covered at the close of this report.

While NADA has had nearly two years in which to organize for an emergency that has been an ever-present threat, it was apparently caught flat-footed so far as plans for extension of the benefits of the national used car plan provided by NRA were concerned. What was presented amounted to speculative conversation and tentative proposals which explored the possibilities of extending the used car provisions of the code as well as other fair trade practices without actually discovering any real possibilities. One proposal suggested extension through a Federal Trade Commission setup; a second through incorporating compliance with Official Guide Book prices in factory contracts of dealers, and third, through taking advantage of anything the Roosevelt Administration might offer as a substitute for NRA.

After many of the directors had left St. Louis for their homes it was reported a movement was launched to appeal to the dealers of the United States, through the National Control Committee, to continue to support the recovery program by pledging maintenance of code hours and wages and voluntary compliance with trade practices as prescribed in the now dead code, especially those provisions relevant to the used car situation in order to protect the gross profit margin necessary to maintain wages and hours.

One interesting interlude to what otherwise was a drab meeting was the proffered resignation of F. W. A. Vesper as NADA president. The resignation, however, was withdrawn when the directors unanimously pledged allegiance and united support. Mr. Vesper's resignation was tendered to clear the atmosphere of alleged personal attacks upon him and at least one member of his personal staff. When the resignation was presented the directorate immediately went into executive session and brought forth a resolution deploring and resenting the "unjustified implications involved in recent personal attacks upon the president and staff of our association and the detrimental activities of some few local and state association secretaries who seem desirous of promoting selfish and personal interests to the exclusion of the development of a proper and constructive program." The resolution was signed individually by the nearly 40 directors present.

It was announced that the official NADA Used Car Guide Book would be continued until the association's present contracts with dealers expire next December. In addition to the guide book the directors authorized

(*Turn to page 758, please*)

Competition to Decide Future Steel Prices

Pressure from Buyers for Below-Code Rates Labeled "Loose Talk" by Industry

There has been much loose talk in the steel market in the last few days that sheet and strip buyers have been seeking to take advantage of the Supreme Court's NRA decision by offering to take round tonnages at below-code prices. Sheet and strip consumption lies predominantly in the automotive field. Whether any representative motor car manufacturer or parts maker has approached steel producers with such bids, is not susceptible of proof or disproof.

Whenever in the past steel prices have given way, it was due to either or both of two causes. Either demand fell off sharply or steel mills would enter upon competitive warfare because none would permit a rival to undersell them. It is often argued in the steel market that automotive buyers exert undue pressure on prices, and, to prove this contention, the charge is made that the large automobile manufacturers buy steel for their parts suppliers and that the automobile manufacturers first set the selling prices for their cars and then go into the steel market to cover their requirements at prices within the limits of what their engineers and cost accountants estimated the steel would cost.

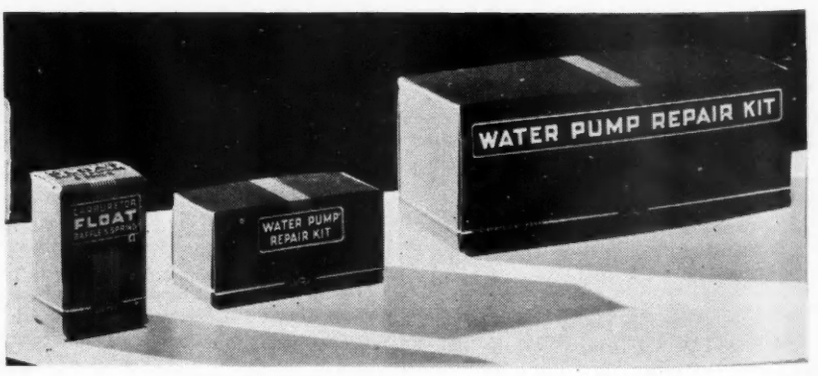
This is all wrong, according to these critics. What the automobile manufacturers should do, they say, is to let their parts makers do their own steel buying, so that there would be more small buyers and fewer large and powerful ones, and the steel manufacturers should be consulted about prices and contracts made before new model prices are announced. All of which is, of course, both uneconomical and impractical. What pressure on the steel market's price structure may ensue as the result of the necessary revamping of the present system, will come, as it always has in the past, from competition among the steel mills. When demand and capacity are on a fairly even keel, price levels enjoy a natural support that is lacking when one mill underbids the other to keep its wheels turning. The NRA upset has not altered these fundamentals. This week's operating rate, in terms of ingot capacity employed, has dropped to 39.5 per cent, according to the American Iron and Steel Institute, a recession of 6.6 per cent from the preceding week. Finishing mill operations have also declined slightly.

Ford Extends Scope of Parts Packaging Plan

During recent months Ford Motor Co. has extended the scope of its parts packaging to include a number of products which were not included in the first series of articles offered in folding cartons.

One of the features of Ford packaging is that each general variety of parts has its own package color. Thus, parts pertaining to the electrical system have one package color; carburetor parts have another; motor parts have another; and so on. This, it is said, makes for convenience in the stock room. Another feature is that the colors chosen were carefully charted, so that window or showcase displays in which boxes of various colors appear do not offend the eye but are inherently harmonious.

Among the products added to the Ford packaged line recently are gaskets and wiring assemblies.



Toronto Chauffeurs Swank in Derbies—Under Orders

City chauffeurs in Toronto must wear derbies from now on. Not satisfied with wearing derbies themselves, the Board of Control notified chauffeurs, who have been accustomed to wearing caps as the most serviceable form of head-gear in driving a car: "No more caps. Wear derby hats. There will be no exceptions."

Pig Iron—With the code up in the air in the forepart of this week, prices were looked upon as strictly nominal. What buying there was consisted of small lots.

Aluminum—The market for both virgin and secondary metal is quiet and unchanged.

Copper—Uncertainty as to whether it will be possible to surround the "Blue Eagle" price with the same security which it has heretofore enjoyed, plus sharp declines abroad, due to the same misgivings, caused inactivity in the market. It is still thought that copper, coming under the head of natural resources, may be accorded price protection not enjoyed by manufactured products.

Tin—Slightly lower prices in London and a recession in Sterling exchange caused Straits tin to open the week at 51.20 cents, ¼ cent lower than last week's closing level.

Lead—With buyers as offish as they were eager a few weeks ago to buy all the lead in sight, downward revision of prices was in order. On Monday a cut of $3 a ton was announced.

Zinc—Dull. The strike in the Oklahoma ore section is petering out.

Evenson, Bray, Martin Switched by Pontiac

A. W. L. Gilpin, vice-president and general sales manager of Pontiac Motor Co., has announced the following personnel changes in the sales department:

J. L. Evenson, formerly assistant sales promotion manager has been advanced to the position of sales promotion manager, taking the place of S. C. Bray, who goes to Denver as zone manager. A. A. Martin has been transferred from the Denver zone managership to the same position in the Cleveland zone, where he succeeds F. C. Sibley, resigned. Mr. Bray's transfer to the Denver zone takes him back to a territory in which he had had previous experience as zone sales promotion manager.

Hercules Motors Moves West Coast Headquarters

Hercules Motors Corp. announces the removal of its west coast representative's office from 613 Russ Building, San Francisco, Cal., to Room 523 Transamerica Building, Seventh and Olive Streets, Los Angeles. Oliver Kelly, who is the direct factory representative for the corporation on the west coast, is now located at the latter address.

Bantam Ball Bearing Co. Builds Plant Addition

The Bantam Ball Bearing Company of South Bend has placed a contract for an addition to their plant. The new unit will enlarge the company's floor space 60 per cent, and is in line with a general expansion program.

The new factory unit will be of steel and brick construction conforming to the design of the present factory building which was constructed in 1928. About 60 days will be required to complete the work. In addition to increased floor space the company has recently augmented its mechanical facilities for the handling of machining, heat treating, and grinding by over 50 per cent and further developments are being planned in this connection at the present time.

Ask Chiseling Charge Quiz by Canadian Tariff Board

The Dominion Tariff Board now conducting an inquiry into the automobile industry in Canada has been asked to investigate charges that manufacturers are importing parts from the United States duty free, ostensibly for manufacturing purposes, but are retailing these parts in competition with jobbers who have paid full duties.

The Board was informed that duties on cars made prices of cars manufactured in the United States prohibitive in the Province of Alberta and that Canadian automobile manufacturers were competing unfairly in the parts business with local jobbers.

Dr. Tuckerman to Deliver Marburg Lecture for ASTM

Dr. L. B. Tuckerman, assistant chief. Division of Mechanics and Sound, and principal scientist, National Bureau of Standards, will deliver the tenth Edgar Marburg Lecture at the 1935 A.S.T.M. annual meeting, June 24-28 in Detroit. The lecture will be given Wednesday afternoon at The Book-Cadillac.

Dr. Tuckerman, who has done considerable work on technical problems pertaining to the airplane and airship fields, has chosen the subject: "Aircraft: Materials and Testing." After a brief review covering the development of the structural design of modern aircraft, pointing out the controlling influence of the demand for a light-weight structure, he will discuss the relationship between mechanical properties of structural materials and the shape of the structural elements which determine the strength-weight characteristics. He plans to describe the requirements of mechanical testing of materials for use in heavily loaded light-weight structures and the structural significance of the tests.

Bankers-NASFC Study Financing Practices

Necessity for Specific Information on Purpose of Advances Essential

Developments in the relations of banks and sales finance companies were discussed at a recent conference of members of the National Association of Sales Finance Companies and representatives of Chicago bankers. T. E. Courtney, NASFC president, told the conferees that it has become necessary to be more specific in the filling out of bank questionnaires and that these questionnaires should specifically state whether the advance of funds requested is for wholesale financing of new cars, wholesale financing of used cars or capital loans. Reports of sales finance companies to their banks, Mr. Courtney pointed out, should distinguish between these three classifications of finance business and give ample information about each.

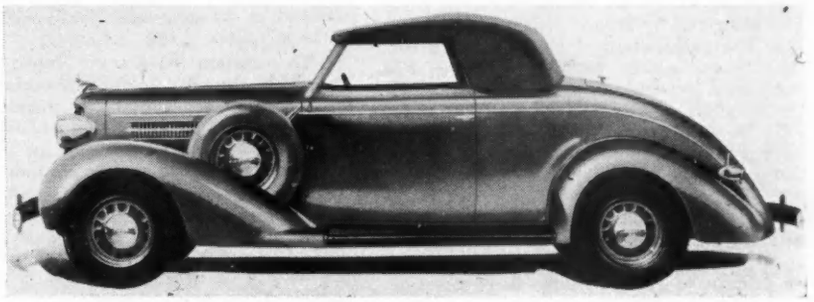
Mr. Courtney told the conference that in some cases advances are being made up to the full value of the application rather than being listed at 80 per cent of value as formerly. One trouble, it was said, is that there is a growing fear that advances on used cars sometimes exceed their sales value. The NASFC president also said that some of these advances are being made so freely that some dealers may be tempted to let their used car stocks accumulate rather than make an effort to dispose of them and while there may be some justification for an occasional capital loan there is a danger finance companies may eventually find themselves owners of dealerships they are incompetent to operate.

Another practice which was mentioned with disapproval was the guaranteeing by a finance company of a dealer's note so that the dealer may obtain money from a bank which otherwise might refuse the loan.

A suggested new form of questionnaire has been drafted and submitted to the sales finance company representatives and banking representatives for their approval as the official form for the association.

Fred Gardner

Fred Gardner, a former president of the Chicago Tube and Iron Company, died June 1 in Miami, Florida. Surviving are his wife and one son. Burial will be in Chicago.



A new addition to the Dodge line is the 116 in. wheelbase convertible coupe. One of the features of the model is its novel body construction. The body has a separate steel frame which, adding its own strength to that of the regular chassis frame.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

There was considerable uncertainty in many branches of industry last week growing out of the Supreme Court's decision that the code provisions of the NRA are unconstitutional. However, the gains in many industries were well maintained; retail sales were larger, and there was an upturn in the volume of wholesale business.

More Freight in Transit

Railway freight loadings during the week ended May 25 totaled 599,543 cars, which marks a gain of 16,212 cars above those in the preceding week, a decline of 26,447 cars below those a year ago, and an increase of 53,992 cars above those two years ago.

Food Prices Steady

Retail food prices during the two weeks ended May 7 decreased 0.6 per cent, according to the Bureau of Labor Statistics. However, current prices are the highest for any May since 1930, averaging 15.1 per cent above those a year ago, 32.8 per cent above those two years ago, and 17.1 per cent below those in May, 1930. Of the 42 commodities used in the index, 14 increased; 18 showed no change, and 10 declined.

Employment, Payrolls Level

The United States Department of Labor has reported that there were no changes in the level of employment and the aggregate value of payrolls in manufacturing industries during the first 12 days of April.

More Current Produced

Production of electricity by the electric light and power industry in the United States during the week ended May 25 was 2.5 per cent above that in the corresponding period last year.

Grocery Chain Sales Increase

The index of sales of store chains compiled by the "Chain Store Age" for April stood at 95.6, based on the 1929-31 average for that month as 100. Sales of grocery chains continued their upward movement.

Crude Output Unchanged

Average daily crude oil production for the week ended May 25 amounted to 2,605,300 barrels, as against 2,650,300 barrels for the preceding week and 2,492,500 barrels for a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended June 1 stood at 82.3, as against 82.7 the week before and 82.3 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended May 29 showed an increase of $1,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and government securities remained unchanged. There were increases of $30,000,000 in money in circulation and of $8,000,000 in monetary gold stocks.

APEM Directors Vote to Continue as Association

(*Continued from page* 749)

different classifications of labor in this industry, in their own communities, in their own state and by groups of competitors.

4. The compilation of classified sales volume figures which, for the first time, has been made available to this industry through the activities of APEM.

5. To keep the members of this industry informed on proposed legislation affecting our industry.

6. The continuation of our activities to direct legislation affecting our industry, both national and state. This activity has taken up a great deal of our time in the past and we propose to continue same in cooperation with the National Association of Manufacturers and all other trade associations, working toward a common end to protect the interests of the manufacturer.

7. To make recommendations from time to time on the general subject of labor relations in order that our industry may have a policy, as uniform as possible, of fair dealing with our employees and, at the same time, protect the manufacturers of our industry against the encroachment of selfish interests.

8. To keep the members of this industry informed as to agreements made with labor by the members of this industry.

9. To maintain the present close relationship with the Automobile Manufacturers Association in order that our policies may not conflict and in order that policies may be adopted by both associations for the best interests of the entire automotive industry.

10. To maintain close and friendly relationship with all trade associations working for the best interests of this industry, both in the original equipment and after-market field.

11. To be sure that proper credit service is rendered to all members of this industry. The present cooperative arrangement between the Automotive Credit Service, Incorporated, of Detroit, Michigan, and the credit department of MEMA seems to be working out in a most satisfactory manner.

12. To maintain a legal department for the benefit of our membership where information and advice can be secured from legal counsel in constant touch with developments at Washington and familiar with the procedure being followed by the leading members of this industry.

13. To encourage and promote group meetings and activities of competitors. We recommend the continuance of Product Groups already organized under the leadership of officers already elected by such groups, until their successors are elected. Please notify APEM headquarters of your desire to continue your Product Group. We will be glad to call meetings of any group upon request.

14. To maintain a clearing house for any and all information which will be of general benefit to the industry and to use our best efforts to promote the automotive industry by every lawful and ethical means.

Hoffman Discusses Safety Legislation Before AMA

Paul G. Hoffman, president of the Studebaker Corporation, was the principal speaker at the spring session of the Automobile Manufacturers Association in New York Thursday. As chairman of the Association's Traffic Safety Committee, Mr. Hoffman spoke on the subject "Safety Legislation Affecting Motor Vehicles."

Munro Joins Graham

F. Willis Munro, for the last four years advertising manager of the Hupp Motor Car Corp., has been appointed assistant advertising manager of the Graham-Paige Corporation.

June Output May Hit 4,000,000

(*Continued from page* 749)

1934, a gain of 45.5 per cent and 639 units in excess of April deliveries. The final 10 days accounted for 3235 cars against 2292 in the same 10 days of the month preceding and 2111 in the corresponding period of May last year.

DeSoto

DeSoto dealers enjoyed an all time record volume during the week ended June 1 when deliveries of 3897 DeSoto and Plymouth cars were made. The previous record of 3860 units was established in the week ended April 6 this year. DeSoto sales for the week were up 10 per cent and Plymouths 4 per cent over the preceding week's deliveries by DeSoto dealers. DeSoto sales to date already have passed the entire 1934 volume. The first few days of June boosted the total of 11,374 for the first 22 weeks of this year well over the full year's volume of 11,447 registrations for 1934. In addition, DeSoto dealers also delivered 55,432 Plymouths during the 22 week period to break another all time record.

Chrysler

During week ended June 1, Chrysler dealers delivered 1144 Chryslers and 3693 Plymouths, a total of 4837 units comparing

with 1157 Chryslers and 3841 Plymouths and combined deliveries of 4998 cars in preceding week. This brought deliveries by Chrysler dealers for the first 22 weeks this year to 86,771 units of which 18,958 Chryslers and 67,813 were Plymouths representing an increase for the combined lines of 50.4 per cent over the similar 1934 period.

Graham-Paige

While factory shipments of Graham-Paige were slightly under April retail deliveries have been running about 20 per cent higher, bringing further reduction in dealers' stocks which now total around 2000 cars. April registrations of Graham cars in the United States alone totaled 1891 compared with factory shipments of 1882 including both foreign and domestic. Graham shipped 1738 cars in May and has scheduled 1806 for June.

Hudson-Terraplane

Retail sales of Hudson and Terraplane cars, which in three of the last four weeks have shown gains of 10 per cent or better over the preceding weeks, totaled 2320 for the week ended June 1. It was the second best week this year and showed a gain of 31 per cent over the corresponding week of last year. May production totaled 10,640 and dealer stocks are around 14,000 cars, well under a year ago.

Plymouth

Retail sales of new Plymouth cars during the week ended June 1 totaled 9857, an increase of 44.4 per cent over the corresponding week of last year, and comparing with 10,016 units in the preceding week. Plymouth sales for the first five months this year were 179,226 cars comparing with 126,164 units in similar 1934 period, an increase of 39.7 per cent.

Pontiac

With production of 19,406 cars in May Pontiac built more cars than in any month since June, 1929. It brought output for the first five months this year to 89,964 units or approximately 20 per cent more than were produced in the full 12 months of 1934. For the first time since the boom years, Pontiac's May production exceeded that of April, normally the peak month. Last month's output was 700 cars in excess of the April figure. The June schedule is only slightly below that of May, showing less than seasonal recession. As the result of the high May output dealers are now in position to make quick delivery of practically any production model.

Harry Strohm

Sales engineer in charge of the new Detroit office of Marvel Carbureter Company, a Borg-Warner division

Reo

Reo shipped 2423 passenger cars and trucks during May, 1935, making that month the best since October, 1930. One-third of Reo's truck shipments during May, exclusive of speed wagons for the United States Government, were of the new lower priced 1½-ton model announced May 1, which placed Reo definitely in direct competition with the lowest priced 1½-ton trucks on the market.

Packard

More than 10 times as many Packard cars were delivered to customers during May than in the corresponding month of 1934. According to M. M. Gilman, vice-president and general manager, deliveries in May totaled 4933 as compared with 473 during May of last year. Factory shipments last month totaled 5614 cars and orders at the factory to date total 7006 units.

Studebaker

Domestic retail deliveries of passenger cars and trucks by Studebaker during the second 10-day period of May were greater than any similar period since 1932, according to George D. Keller, vice-president in charge of sales. The second 10-day period of this month, Studebaker dealers delivered at retail 1533 passenger cars and trucks. This exceeds the same period of 1934 by 14.6 per cent, and the same period of 1933 by 65 per cent.

Dodge

Dodge passenger car deliveries during week ended June 1 totaled 4806 compared with 4697 in preceding week and with an average of 4611 for each of the four preceding weeks. During the first five months of this year, Dodge dealers delivered 157,722 vehicles, of which 52,981 were Plymouths and 104,741 were Dodge passenger cars and trucks. This was an increase of 60.2 per cent over the 98,479 units delivered in the corresponding period last year. Used vehicle sales reported by Dodge dealers for the latest report week total 8671, practically paralleling deliveries of new vehicles.

Automotive Exports for First Four Months 28% Above Corresponding Period of 1934

	April				Four Months Ended April			
	1935		1934		1935		1934	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories	....	$22,016,562	....	$21,452,737	....	$84,794,636	....	$66,115,020
Motor trucks, buses and chassis (total)	8,092	4,136,797	10,756	4,880,262	30,269	15,775,532	34,444	15,513,082
Under one ton	831	263,969	1,415	434,761	2,576	864,017	3,715	1,126,957
One and up to 1½ tons	5,787	2,552,829	7,966	3,251,921	22,471	9,963,717	26,611	10,714,832
Over 1½ tons to 2½ tons	1,209	952,781	1,162	842,840	4,301	3,383,460	3,362	2,620,649
Over 2½ tons	189	292,449	179	328,786	742	1,418,680	642	989,883
PASSENGER CARS								
Passenger cars and chassis	18,341	9,979,336	16,509	8,773,751	65,427	36,414,104	45,207	24,575,609
Low price range $850 inclusive	17,234	8,777,056	15,294	7,444,242	60,832	31,301,475	41,695	20,616,477
Medium price range over $850 to $1,200	824	793,945	786	763,099	3,380	3,245,742	2,225	2,138,334
$1,200 to $2,000	114	172,771	243	380,095	524	812,950	695	1,106,891
Over $2,000	72	197,658	55	134,098	346	916,696	224	580,166
PARTS, etc.								
Parts except engines and tires	....	.....	....	.....	....	.....	....	.....
Automobile unit assemblies	....	4,482,539	....	4,831,620	....	20,501,687	....	15,601,625
Automobile parts for replacement (n.e.s.)	....	2,235,498	....	1,955,770	....	8,295,607	....	7,192,522
Automobile accessories (n.e.s.)	....	294,915	....	256,097	....	1,054,270	....	910,199
Automobile service appliances	....	406,728	....	176,706	....	1,338,829	....	706,018
Airplanes, seaplanes and other aircraft	32	684,036	23	544,036	128	3,426,629	90	1,481,428
Parts of airplanes, except engines and tires	....	425,047	....	294,762	....	1,549,899	....	1,005,813
INTERNAL COMBUSTION ENGINES								
Stationary & Portable:								
Diesel and semi-Diesel	17	51,879	9	25,842	113	275,974	43	102,410
Other stationary and portable:								
Not over 10 hp.	550	38,114	493	35,301	2,717	167,895	1,374	100,347
Over 10 hp.	110	57,723	124	67,031	445	266,912	355	238,001
Automobile engines for:								
Motor trucks and buses	670	114,802	960	115,319	1,302	218,709	1,492	182,897
Passenger cars	4,133	266,114	4,332	272,957	11,755	760,211	12,039	738,343
Aircraft	51	215,786	88	477,257	159	537,766	383	1,747,022
Accessories and parts (carburetors)	....	145,475	....	101,035	....	517,850	....	409,661
IMPORTS								
Automobile and chassis (dutiable)	41	14,921	40	8,466	146	76,406	152	57,726

NADA Directors Discuss NRA Replacement Program

(*Continued from page 754*)

the publication of the "NADA News" as an official trade paper replacing the Bulletin. The new paper will contain solicted advertising.

Edward Payton, automotive business analyst who addressed the directors, pointed out the opportunities to definitely determine the dealers' profit position, "if any," and emphasized the sensible and practicable usefulness of facts in future factory-dealer relationship conversations of the association. The directors pledged Mr. Payton that returns on the questionnaires necessary to make the representative presentation of the dealer profit position for the United States, representing at least 20 per cent of the dealers in their respective states, would be provided.

J. Reed Lane, executive secretary of the National Control Committee, appealed to the directors to do all in their power to hold the dealers in line so far as compliance with the dealer code is concerned.

Detroit was selected for the annual convention and the date was set tentatively for the second week of January, 1936.

Details of the previously mentioned recommendations include: Cancellation — not without cause, without written notice, for a reasonable period in advance of cancellation; repurchase of new motor vehicles and parts from dealers cancelled without cause; prompt payment for all materials repurchased; reasonable and equitable assumption by factory of unexpired leases assumed by dealer with written consent of factory; assumption by factory of all outstanding time paper obligations incurred.

However, the brief provides that the factory may have the right to cancel for cause and without notice, "if and provided the dealer has been found wilfully violating the provisions . . . particularly referring to new motor vehicle prices, and used motor vehicle allowances and has refused, under a lawful cooperative agreement providing for liquidated damages for such violation, to liquidate such damages provided by such lawful agreement."

Under used car allowances it is recommended the dealer franchise contract should contain the following provisions: "that the dealer must use, adhere to and make no allowance in excess of the maximum values of used motor vehicles taken in trade . . . as the same shall be determined and established from time to time by the NADA Official Used Car Guide Book, published by the NADA, and that the dealer shall abide by the rules for use of such official Used Car Guide as now printed therein."

On the matter of consignment it is proposed that a clause be inserted in dealer contracts by factories requiring them to make and collect a charge of not less than 15 per cent of the gross amount of the sale, plus any expense incurred by the dealer in reconditioning or repairing the motor vehicle to be sold.

New car prices—Contracts shall provide that the dealer shall not offer or sell a new motor vehicle at retail to the consumer for less than the respective factory-suggested delivered price effective in the territory in which the dealer operates.

Fleet discounts—Contracts to contain provision whereby fleet buyers receive not more than 15 per cent discount from dealer; however, "since the discount has been historically predicated on the value of such account to the manufacturer, such a provision in the franchise should call for an equal participation in the amount of total discount given the fleet buyer on the part of both dealer and manufacturer."

Obsolete and discontinued models—Contract to provide that manufacturer reimburse dealer up to at least 50 per cent of any reduction in delivered list price made by dealer in order to sell obsolete motor vehicles.

Gross margin—Contract to provide against reduction during period of contract.

Dealer discounts — Contract to provide that the rate of discount on the manufacturer's product stipulated in the original contract should not be reduced during the period of that contract.

Accessories and special charges—Contract should provide mark-up at least equal to that granted the dealer on the motor vehicle, except on taxes.

Shipment of motor vehicles to dealer by manufacturer to be only upon dealer's firm order.

Sales territory protection—Prior to the installation . . . of additional dealers or sub-dealers or other retail outlets by the manufacturer, dealer shall have reasonable notice and full opportunity for an impartial investigation . . . and dealer shall have the right to treat the contract as cancelled without cause by the manufacturer and be entitled to the rights and the manufacturer subjected to the penalties resulting therefrom.

Time payment sales—The dealer to have right to freely handle his time sales through companies of his own choosing, provided the ratios charged buyers are equitable.

Frank M. Hawley
Newly appointed manager of Morse Chain Co.'s Detroit plant

D. B. Perry Succeeds Morse As Chain Co. President

Directors of the Morse Chain Co., a Borg-Warner division, have elected D. B. Perry president to succeed F. L. Morse, who died in March of this year. Formerly Mr. Perry was vice-president and secretary of the company. C. J. Kenerson, formerly treasurer, was named vice-president, general manager and treasurer, succeeding F. C. Thompson, whose death preceded that of Mr. Morse by about two weeks.

Other new officers are N. K. Van Osdol, secretary and assistant general manager; S. B. Waring, assistant secretary and assistant treasurer. Frank M. Hawley was named sales manager of the automotive division and manager of the Detroit plant.

4 Cylinder Engines Predominate Race

(*Continued from page 751*)

Jean Marsenac, who so ably prepared the Hartz entries in previous years, did not officiate in the Hartz-Frame garages this year. Instead the cars entered by Hartz and Frame were prepared by Reilly Brett.

An unusual device designed to prevent oil from foaming was employed on the Miller Four driven by Deacon Litz. According to race drivers, mineral oil in racing engines has a tendency to foam and expand, which causes it to be forced out through the breather pipe. The device used by Litz consisted of a number of float-operated valves and a small radiator.

An unusual front-wheel bearing construction was found on the rear-drive car entered by Pirrung. This car, which was considered the sturdiest of all those entered, employed a double-row ball bearing at the inner end of the front-wheel spindle and a single-row bearing at the outer end. The frame had nine tubular cross members. To ensure a good ride, three shock absorbers were used at each spring, in addition to inserts between spring leaves. Other cars also employed more than the usual number of shock absorbers.

Canadian New Car Financing Up 49%

The upward trend in numbers of motor vehicles financed during the first quarter of the year was maintained in April when 12,709 vehicles were financed to the extent of $5,354,670, an increase of 49.7 per cent in volume and 53.1 per cent in the amount of financing compared with the same month last year. The number of new vehicles financed was 4750 at $3,235,446 against 3119 at $2,109,794 in April, 1934. The used car totaled 7959 at $2,119,224 compared with 5373 at $1,387,137.

Ryerson on N.Y. Life Board

Edward L. Ryerson, Jr., president of Joseph T. Ryerson & Son, Inc., large steel-service organization, was recently elected to the board of directors of the New York Life Insurance Company. Mr. Ryerson succeeds Alba B. Johnson of Philadelphia who died recently.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland..Sept. 11-21
New York Automobile Show, New York, Nov. 2-9
Detroit Automobile Show.....Nov. 9-16
Buffalo Automobile Show .....Nov. 9-16
Cincinnati Automobile Show.....Nov. 10-16
Automotive Service Industries Show—Atlantic City .....Dec. 9-13

CONVENTIONS AND MEETINGS

S.A.E. Summer Meeting—White Sulphur Springs, Va. .....June 16-20
American Society for Testing Metals, Detroit .....June 24-28
National Industrial Advertising Association, Pittsburgh.....Sept. 18-20
American Transit Assoc., Bus Division, Atlantic City .....Sept. 23
National Assoc. Sales Finance Cos.—White Sulphur Springs.....Sept. 26-28
American Society for Metals, Annual Meeting—Chicago .....Sept. 30-Oct. 4
National Safety Council, Louisville, Ky. .....October 14-18
American Gas Association — Atlantic City .....Oct. 14-18
Los Angeles .....Nov. 2- 9
Newark, N. J. .....Nov. 9-16
American Petroleum Institute — Los Angeles .....Nov. 11-14
Philadelphia .....Nov. 11-16
Baltimore .....Nov. 16-23
National Industrial Traffic League—Chicago .....Nov. 20-21
Columbus, Ohio .....Nov. 23-28

JUST AMONG OURSELVES

A Decision the Court Can't Make

APPARENTLY some critics of the NRA decision think the Supreme Court should rewrite the Constitution. They lose sight of the fact that the Constitution is a limited grant of power from the people to the federal government and that only the people have the power to change the limits.

If the people believe that modern economic conditions make it imperative for Congress to have power to regulate intrastate commerce and to set national labor standards, they can broaden the Constitution and do it rather quickly as the speed with which prohibition was repealed demonstrated. To expect the Supreme Court to do this job for the people does not evidence too great a concern about the fundamentals of our political system.

Admittedly those who wrote the commerce clause could not foresee the changes which time and progress have wrought in our economic organization. Perhaps these changes demand a transfer of further powers to the federal government. If that is the case, there is a way to do it.

* * *

The Problems Are Still With Us

THERE were some phases of NRA which the automotive industry found hard to stomach. But the experience under the law was not without its compensations. There is no doubt that it served to focus the attention of management more sharply on labor relations than might otherwise have been the case. As a result, major executives were brought more closely in touch with the details of working conditions and became more alert to the desirability of knowing what their employees were thinking about.

The fact that the law is now a dead issue does not make these matters any less vital and there is every reason to expect that in the main automotive management will continue to view labor relations as one of its most difficult and at the same time most important problems. The need for mutual understanding by both men and management and for sincerity of purpose and action is as great as it ever was.

* * *

Federal Aid and Uniform Motor Laws

IT has been suggested that Federal Aid Highway funds might be used to speed adoption by the states of the uniform motor vehicle laws developed by the National Conference on Street and Highway Safety. The idea is that the transfer of these funds to the states might be conditioned on the adoption of the model uniform statutes. Perhaps the end would justify the means which represent an encroachment on the rights of the states. Incidentally, in its NRA decision, the Supreme Court indicated quite clearly that these rights are real and not to be lightly brushed aside.

* * *

The One May Be Yours or Mine

ONE child out of every three will be killed or seriously injured in an automobile accident before he has completed his normal span of life, latest estimates indicate, according to the U. S. Rubber Co. Odds of three to one are pretty short. They demonstrate the need for immediate and effective educational effort to end dumb driving. Leaving human considerations out entirely, the repercussions which this situation may have on automotive sales are enough to justify concerted action by the industry. Whatever money and effort is put into making motoring safer will be well invested. The industry can't afford to be parsimonious with either.

* * *

Flexibility in Demand Both Here and Abroad

EUROPEAN automotive plants have been developing rapidly during the past year or so into major outlets for many specialized machine tools made in the United States, J. D. Rovick, of the Michigan Tool Co., who has just returned from 18 months abroad, points out. The reason for this growth in business is the flexibility our tool manufacturers are incorporating in specialized equipment—a characteristic of mass production machinery, incidentally, which our own engineers are finding to be highly desirable. Without any promptings from our own sales department, we might mention too that *Automotive Industries* has a very comprehensive circulation among automotive plants abroad.

* * *

As Others See Us

"GIVE an automotive engineer a new material and sooner or later he's going to find a use for it on the great American vehicle." This sentence from the Plaskon Parade appealed to us as a rather nice compliment and one that on the whole is deserved, the complaints of those who are irked by the fact that automotive progress is evolutionary rather than revolutionary to the contrary notwithstanding.

The Editors.

End of NRA Is Industry's Labor Relations

by Norman G. Shidle

THE death of NRA and industry's perhaps permanent reprieve from the threatened Congressional sentence to operate under the Wagner Labor Bill will bring to automotive executives who are far-seeing in labor matters a feeling of new opportunities to be grasped rather than of irritating restrictions escaped or avoided.

Whatever the future status of the Automobile Labor Board—to which the Supreme Court's decision may indirectly act as a blood-transfusion at a critical moment—the convictions in workers' minds which generated the hundreds of cases already brought before that tribunal will remain whether any such extra-factory tribunal exists or not. Removal immediately of all chance of appeal outside the walls of the factory in which he is employed might even make the average worker more prone to see injustices where none exist.

Just prior to the Supreme Court's anti-NRA decision, the writer spent several weeks in intensive investigation of the current automotive labor situation, talking with many automotive executives, with men representing the labor viewpoint and with others.

Reactions thus secured emphasized particularly the need for keeping clearly in mind the emotional springs which motivate individual reactions—and the danger of permitting political and legislative possibilities and happenings to obscure these more fundamental aspects. Quotation of individual ideas is impossible, for obvious reasons. Summarization and interpretation of views, on the other hand, is feasible and may be equally valuable.

Automotive executives who have been really close to and active in the labor situation for a period of years reveal a clear belief that removal of what may be generally lumped as "New Deal" restrictions on employer-employee relationships in the automotive industry would (1) improve the chances of harmonious relations in those plants where the management sincerely, actively and regularly has tried to get the workers' viewpoint and do a constructive job of employee relationships; (2) bring increased labor difficulties in the long run to managements which saw the removal of external restrictions merely as a chance to "put labor back in its place."

And what the chief executives of corporations say, this practical group agrees, is not nearly so important as the spirit in which general policies are administered in detailed manner by minor supervisors. An important labor problem would still exist in the automotive industry, these men believe, even if Herbert Hoover were President and rugged individualism in management were given full sway.

With NRA dead and the legality of such measures as the Wagner Bill more strongly in doubt than ever, individual workers—whether union-minded or not—almost inevitably will be more suspicious than ever of management moves in labor matters. Removal of compulsion from management in its dealings with employees, therefore, gives an unusual opportunity for any individual management to prove its sincerity by increasing rather than withdrawing its willingness to talk matters over with its own employees, to insure fairness in detailed cases of hiring, discharge, layoffs, wages and hours, and to take sufficient time and effort to make certain that the employees are convinced that its actions in these regards have been fair.

Employee conviction of management fairness is just as essential as the actual presence of management fairness in itself.

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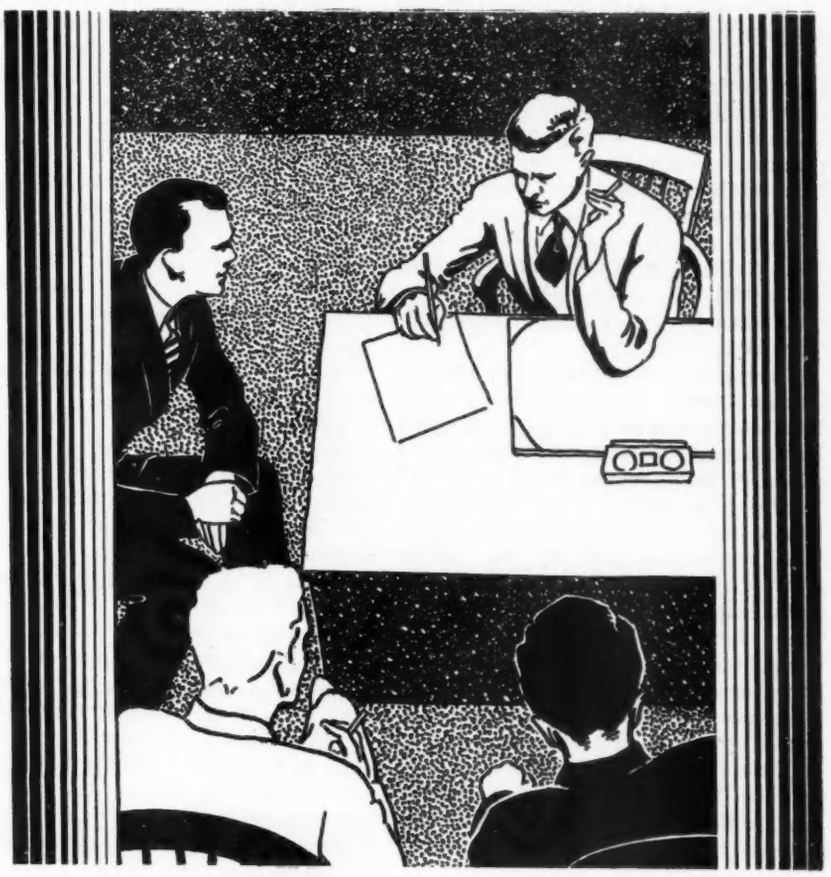
Employee conviction of management fairness is just as essential as the actual presence of management fairness in itself.

Opportunity to Solve Its Problems Constructively



willingness to talk matters over with its own employees, to insure fairness in detailed cases of hiring, discharge, lay-offs, wages and hours, *and to take sufficient time and effort to make certain that the employees are convinced that its actions in these regards have been fair.*

Employee conviction of management fairness is just as essential as the actual presence of management fairness in itself.

Whatever may be its future status, the Automobile Labor Board, in its written records of cases and decisions, has provided interesting data for study by managements seeking further insight into the psychological sources of dissatisfaction in individual employees. Analysis of scores of these case records is very likely to stimulate some ideas peculiarly pertinent to the future labor situation.

The first offhand reaction from reviewing these cases is to question if the effort involved in the setting up and operation of the machinery of an outside board of this kind is worth the results to be obtained.

Take, for instance, the Case of the Alleged Improper Layoff of Edward Pantel by the Fisher Body plant at Janesville, Wis.

Before he was laid off in November, 1934, Mr. Pantel had worked at nailing decks and on trunk panels. This work he did satisfactorily. When he returned in December, there was no work on trunk panels and somebody senior to him was nailing decks. He was tried at various work generally similar to what he had done before, and at none of which he was satisfactory; and finally at fitting backs. Mr. Pantel was not able to keep up with this work satisfactorily and did not obey instructions. The employer therefore laid him off Jan. 4, 1935.

Mr. Pantel contended that the employer should have given him three or four weeks to break in fitting lower backs. Under the Board's Rules of Lay-off and Rehiring, of May 18, 1934, seniority is based on seniority in the plant, if there is work that the employee claiming seniority can do. Work that he can do means work for which he is available immediately in the circumstances in which it has to be done. There was no testimony showing that nobody was immediately available to fit lower backs at the rate at which the line was moving, or that the employer had allowed somebody junior to Mr. Pantel time to learn the job that it would not allow Mr. Pantel. He was not entitled, the board ruled, to displace somebody else who already could do the work in order that he himself might have time to learn it.

The board ruled that the lay-off was not improper.

To clear up this situation, no less than 18 people were involved as witnesses, assistants to the plaintiff, and representatives of the defense—in addition to the three members of the ALB.

It has not been unusual for this number of people to be involved in expenditure of time and effort on a case of similar magnitude.

A large majority of ALB cases, moreover, involving seniority, speedup, discharge, lay-off and so forth, it would seem to the casual observer, could and would have been decided just as about as they were had the case been taken up by the worker within the plant itself.

It must be admitted, however, that the case of Edward Pantel—however small its magnitude as compared to the entire production and personnel problem of the automotive industry—was extremely important to Edward Pantel.

And justice to be effective for the individual must be available for the individual.

It can be argued, therefore, with some force, that even if most cases coming before an outside board develop no injustice to have been done, the presence of such a board helps materially to prevent the doing of individual injustices in the first place—and that if there is no purpose on the part of the employer to do injustices, he should not object to the presence of an outside agency of redress for his workers.

Study of the ALB cases indicates that the employers were upheld quite regularly so far as matters of seniority were concerned. This seems natural in view of the fact that proper handling of seniority is largely a matter of accurate keeping of detailed records and willingness to apply honestly the facts shown by those records. The plaintiff employee, apparently, rarely had the facts accurately before making his complaint—or, if he had the facts, was unable to interpret them accurately.

On matters of discharge, lay-off and speedup, there have been more decisions against the employer, but even in such cases a vast majority went against the plaintiff. Here, again, this is a natural condition, assuming an honest tribunal and a sincere intent on the part of the managements to abide by the rulings previously laid down by the board.

In some instances, Richard Byrd, labor member of the board, has disagreed strongly with the decision of the other two members, voicing his disagreement in no uncertain terms in a minority report. Interesting, in some of these cases, is the difference of point of view, because it does reflect certain basic differences between labor as opposed to management thinking.

Management and Employee Viewpoints Differ

The case of the alleged improper discharge of Mirone Fauxe by the Dodge Truck division of Chrysler is a case in point.

Mr. Fauxe, the decision of the board states, who had a reputation for being an excellent worker in the main plant, had been unsuccessful at the first work on which he was placed in the truck plant and had reported that he could not keep up with the touch-up work at the end of the line and asked to be moved. The employer then put him at work in the middle of the line. His superiors reported that part of the time he did excellent work, but that he also did much that was unsatisfactory. After the lay-off of June 4 and his return on Dec. 3, 1934, the complaints of his work and the warnings increased until his discharge.

Mr. Fauxe alleged that after his return his employer discriminated against him in giving him less work than it gave others in the same department, and insists that his work was up to the usual standard. The record of time which employees in the department worked did not bear out the complaint of the discrimination, and the evidence indicated to the board that the complainant had allowed his work to fall below reasonable standards in the face of repeated warnings. No question of unionism was involved.

The board ruled that the discharge was not discriminatory or improper, but Mr. Byrd in an interesting dissenting opinion took the stand that, even though a strict interpretation of the record might show the discharge to be proper, Mr. Fauxe should not have been discharged. "Assuming that Mr. Fauxe was mistaken on all counts," Mr. Byrd states, "I hold that the administrative failure of supervision to return him to a satisfactory mental condition by proof to him of his errors was responsible for the breakdown of his satisfactory service to a degree equal to his own failure."

The very sameness which runs through many of these ALB cases indicates existence of a feeling by many employees that they are constantly in danger of unfair treatment on certain routine counts. Whether or not the presence of an outside agency is necessary to procure justice or to disabuse the employee's mind of the suspicion that injustice exists is open, of course, to serious argument. The fact remains that the mental attitude exhibited by the ALB cases probably will continue to exist in a number of employees whether such an outside agency exists or not and will continue to constitute a major management and personnel problem.

"There is a great need," one executive told us, "for unemotional analysis of emotional employee reactions.

"Industrial peace is likely to come more quickly to those plants which accept unjudicial, emotional thinking on the part of employees as a normal, natural part of the problem than to those which predicate their thought and action on the theory that logic is mighty and must prevail.

"It isn't so important at the moment *what* the average worker is thinking as *why* he thinks as he does. To prove that a thread should never have become tangled does little to undo the tangle—helpful as such reasoning may be in preventing re-entanglement at a subsequent date."

Whatever laws may be passed or defeated, whatever boards may be set up or knocked down, and whatever progress or retreat unions may make, there are strong indications that labor harmony in given plants always will depend heavily on the type of contact in the individual plant between the management and the workers—and particularly between the foreman and the workers.

True, no management can rest easy as regards its industrial relationships while the Coughlins, the Greens, and the Longs are hurling their dynamite sticks into the solid foundations of American industry. There can be no denying the strength of the influence of these political and legislative forces outside the individual plant. But some individual managements can—and are—making the best and others the worst of the situation as it now exists and seems likely to exist for some time to come.

More than one observer thinks that the reason for greater labor trouble in some parts of the industry than in others lies as much in detailed acts of minor supervisors as in any actual difference in basic working conditions; as much in what has not been said publicly by some executives as in what has been said publicly by others.

Ford Notably Free from Labor Troubles

Henry Ford has been notably free from labor troubles in the present furor. Analyzed, there seems to be no great difference of opinion on labor matters between Mr. Ford and other automotive executives. It is interesting to note, however, that Mr. Ford's pronouncements on the labor situation have regularly echoed one thought: "The workers ought to get more money." This came out again last week at the time Ford raised his minimum scale to $6 a day again. Added to the announcement was the statement that: "Mr. Ford has said repeatedly that wages are far too low and recently declared that 'we haven't seen any real wages yet.'"

With voluntary or compulsory bargaining of one kind or another still likely to be an important part of factory management in the future, it is interesting to examine the attitude of different managements toward such a practice and the opportunities and dangers which it seems to hold at this critical juncture.

Some factory managers have looked upon the collective bargaining agencies and the ALB as necessary evils to be dealt with in accordance with legal requirements and as briefly as possible to settle definite demands or suggestions brought up by the employees' representatives. Nobody, so far as we can find, has tried to inhibit or block the functioning of these agencies.

Other factory managers have taken a very positive attitude in dealing with their workers' representatives.

Here is the way the problem looks to

one Detroit observer whose practical experience entitles him to positive views:

"Most of the employee representatives who have been elected are unskilled in the use of this new collective bargaining function which they now have. If the management sits back, taking an 'All right, what do you want?' attitude, the immediate desires of many of these groups can be frustrated and their somewhat inarticulate presentations beaten back with apparently forceful logic and sound reasoning.

"Such victories as management may win on such a basis, it seems to me, are hollow and may turn out to be boomerangs. The union men, although a small minority of those elected to the current collective bargaining agencies, are the only ones in the group who are skilled in organization, in negotiation and in labor politics. They will naturally assume leadership of these currently inexperienced employee groups. And the language their leadership speaks is primarily that of struggle, force and strike.

"Only if management goes more than half-way to give collective bargaining representatives the facts and data which they need if they are to understand the whole problem involved in acceptance of their ideas can the inexperienced representatives be expected to learn how to use their new powers forcefully and constructively.

"The smart management will tell them all it can about the business as a whole, take whatever time is necessary to discuss any problem brought up, and help the representatives in every way possible to help their constituents to whom they are responsible."

Facts Establish Confidence

Difference in management attitude unquestionably revolves much around the difference of executive opinion about the possibilities of getting help from shop committees in the enforcement of certain elements of shop discipline and in preservation of harmony. (See *Automotive Industries*, p. 695, May 25, 1935 — "Who Should Control Shop Discipline?") In one plant recently, the shop committee was so strongly convinced of the fairness of the management in its dealings and attitude that the leader of the committee took vigorous action to quell an incipient strike in one department before it had even come to the attention of the management officially.

One important labor leader, not a supporter of the closed shop and on none too friendly terms with the A. F. of L., voiced an employee view when he said in conversation the other day, "You can trust the fairness of the men in the shops if they have all the facts, if they have experience in working with management and if they are given true information." He emphasized, however, the importance of experience in dealing with management and saw real dangers in moving other than slowly toward the objective which he sees as most desirable—a condition in which the foreman has relatively little power from a personnel standpoint and in which personnel matters are in the hands of separate men in the selection of whom the workers themselves have something to say.

Between the extreme advocated by this labor leader and the feeling that shop discipline in all of its aspects is none of the employees' damned business, more than one plant in the automotive industry today is steering a cautious, tentative course which, backed by sincerity of purpose, is bringing better than average results under current trying circumstances.

Purposely, this discussion has avoided concentration on what might be called the "mechanical" or legislative aspects of the current industrial relations situation, vital and important as those phases unquestionably are. Our objective has been rather to reemphasize certain individual psychological elements which are involved in a very practical way at present and which quite possibly may be dominant influences in the practical working out of any individual situation.

New Process Makes Wood Non-Shrinkable

A NEW process for making wood practically non-shrinkable has been developed by Dr. A. J. Stamm, chemist of the Forest Products Laboratory, according to an announcement of the Forest Service, U. S. Department of Agriculture.

Previous attempts to make wood less subject to change with weather conditions have been confined to direct impregnation of dry wood with some wax. Such processes failed because the impregnation was always incomplete and when the treated wood was exposed to moisture, the water quickly penetrated the millions of unsealed cavities and unsealed openings in the wood tissue.

Dr. Stamm's process makes use of an intermediary or transfer solvent. Green wood, whose natural water content keeps the submicroscopic membrane spaces wide open, can be used, thus eliminating the necessity for seasoning. "Cellosolve," the intermediary substance, is injected into the wood by a replacement process, dissolving into and replacing the water, which, because it boils at a lower temperature than does cellosolve, is distilled off.

Impregnated with cellosolve, the wood is next placed in a melted wax bath, and the replacement process is repeated, with the wax dissolving into and replacing the cellosolve, which is in turn distilled off. Beeswax and stearin are two of the waxes successfully used in the process, but such substances as rosin and linseed oil can also be used with waxes in many combinations.

An important feature of the new process is the fact that the green wood, when filled with waxes, very nearly retains its natural size even through wide changes in the moisture of the surrounding air. There is no initial damage such as often occurs when green wood is dried, so that loss of wood from checking, bowing, twisting, and the like is largely eliminated.

Tire and Rim Yearbook

THE Tire and Rim Association, 1401 Guarantee Title Building, Cleveland, Ohio, has published the 1935 edition of its Yearbook. It contains the membership lists and lists of committees of the organization, load and inflation tables for the various kinds of tire, standard rim contours, data on rim gages and tire valves, tables of standard tire equipment of American passenger cars in current production, as well as load and inflation data on agricultural tractor tires, data on agricultural tire and rim combinations, carrying capacities of solid and cushion tires, sizes and maximum loads of industrial truck and trailer tires, a metric load and inflation table, a table of rim diameters and corresponding circumferences, a millimeter-inch conversion table, etc. The book is sold by the association for $2.

A Compact Injection Pump Speed Engines with Small

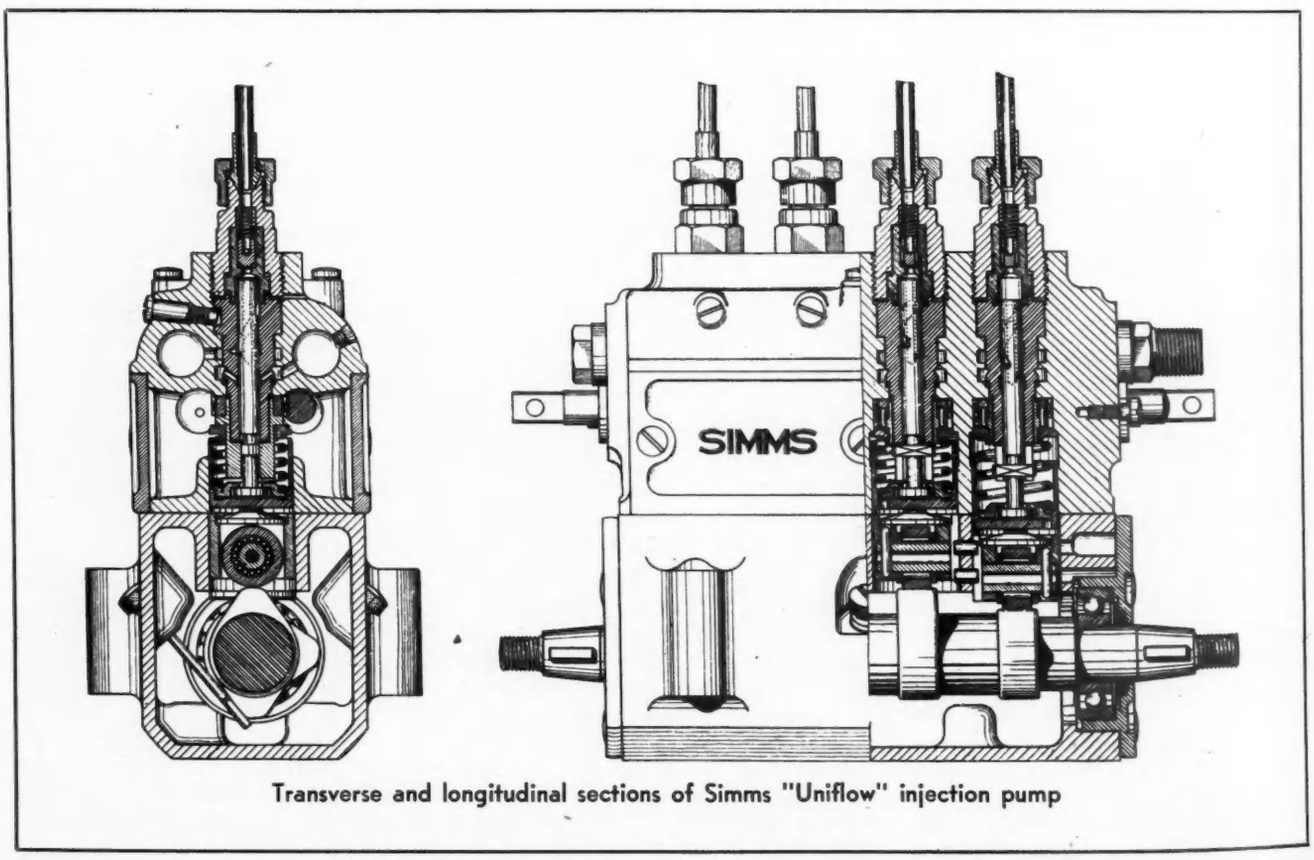
British maker also develops new pump coupling, manual timing device and fuel oil filter

SIMMS MOTOR UNITS, Ltd., London, England, is now manufacturing a fuel injection pump which is claimed to be particularly adapted to use on high-speed engines with small cylinders. It is known as a "uniflow" pump, because the oil passes through its barrels in one direction.

Referring to the sectional views of the pump, the working parts comprise a suitably recessed and ported plunger, a suitably recessed barrel, a delivery valve, and mechanism for rotating the plunger to give variable cut-off or spill. During the suction stroke of the plunger, oil enters the suction annulus in the barrel under some pressure, and when the plunger is near its lowest position this oil passes through radial ports into the axial hole in the plunger, through which it reaches the pump chamber. During the following up stroke, this oil is ejected from the pump chamber by the plunger, passing out through the delivery valve at the top of the pump chamber. When the plunger is near the top of its stroke, the helix in it and that cut in the barrel come into registry. This relieves the pressure on the oil, the delivery valve closes, and during the rest of the up stroke oil spills through the helical channel in the plunger into the spill annulus. The pump and tank connection may be duplicated, so that the spilled oil returns to the fuel tank, and fresh, cool oil constantly circulates through the pump.

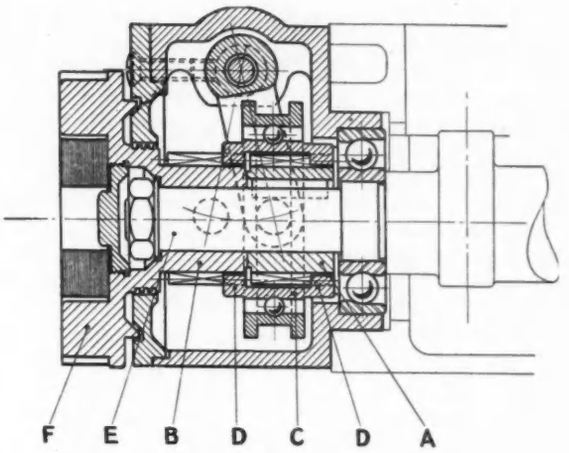
Careful consideration is said to have been given to all important details. Thus the arrangement of the barrel-securing nut is said to be such that it is impossible to distort the barrel by putting undue pressure on the nut.

The pump is unusually compact, the

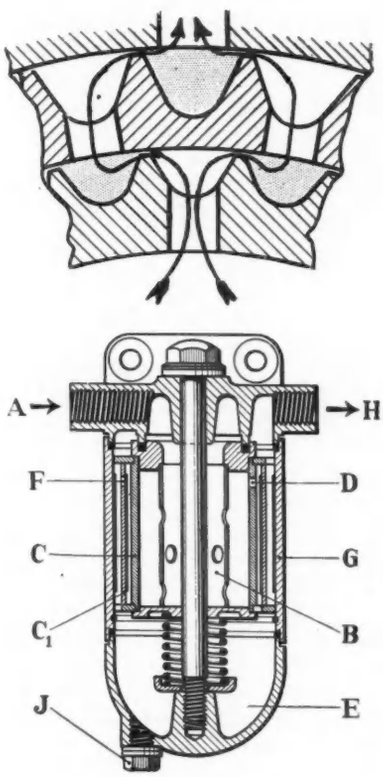


Transverse and longitudinal sections of Simms "Uniflow" injection pump

for High Cylinders



Manual timing device for injection pump



Sectional view of Simms fuel filter and detail of filtering element

distance between plungers being only 1.4 in., the over-all height, 8¼ in. and the camshaft center height, 1½ in. It is composed of two main units, the pump body containing the plungers, barrels, fuel control mechanism, and fuel leads, and the cam casing, which contains the camshaft and tappet mechanism. It is claimed for this two-part construction that it has the advantages that the pump body can be made from a drop forging in which all of the fuel leads are drilled, and that the cam casing can be readily modified to suit the requirements of different manufacturers. The pump body is drop-forged from R. R. alloy which has a tensile strength of 30 tons per square inch. Either four or six pump elements are set into the pump body. The quantity injected per stroke is controlled by means of a cut-off mechanism comprising a rack by means of which the plungers are rotated around their axes. A vernier type of adjustment is provided to permit of adjusting the angular positions of individual plungers. This vernier consists of the spill-control pinion in conjunction with a series of holes in the flange on the member on which the pinion is mounted, the pinion connecting to the flange by means of two pins entering oppositely located holes. By changing from one pair of holes to the next and at the same time changing the mesh of rack and pinion, a very fine angular adjustment can be made.

An advantage claimed for this design is that the controlling edges of the spill ports in the plunger and barrel respectively are parallel with each other, hence spill-port action is rapid and the line pressure falls off very rapidly, which tends to prevent after dripping.

The delivery valve is claimed to allow a certain amount of the fuel in the line to return through it during the short time required by the valve to seat itself, whereby the line pressure is relieved between injections.

All fuel passages in the pump body are drilled. The tappet rollers are provided with needle bearings.

The same firm has brought out a driving coupling for these pumps. Simms is the originator of the type of magneto coupling (much-used abroad) comprising a toothed member of molded rubber which is inserted between correspondingly toothed metal members, and this new coupling is of similar type. It consists of a driving member of cylindrical form with 20 internal projections or teeth, a driven member bored to suit the standard pump driving shaft and having 20 teeth or projections on its periphery, and a flexible member designed to mesh with both the driving and driven members and forming an elastic interconnecting member between them. The driving member is in two parts, one connected to the driving shaft, the second connected to the first by three studs passing through tangential slots, which permits of angular adjustment.

Another accessory is a manual timing device for injection pumps which consists of a sliding member with two sets of internal splines, at opposite ends of it, the splines being inclined in opposite directions. These splines engage splines on the driving and driven members, and by shifting the splined sleeve

axially, the angular relation between the driving and driven members can be varied.

Simms Motor Units also produces a fuel filter for Diesel engines. As shown in section in one of the drawings herewith, this filter comprises four main parts, viz., a junction casting for the supply and delivery of oil, a sump at the base of the filter, an outer cylindrical casing, and two serrated filtering elements. These parts are held together by a central stay bolt with a cap nut at the upper end.

In operation, oil entering through inlet A flows into the center of the apparatus through perforations in drum B. Cylinder C has a series of serrations on its outer surface, and the oil next passes into vertical channels formed by adjacent serrations, through holes D drilled at the upper ends of alternate channels.

At their lower ends these channels open into the sump E, into which comparatively large particles are projected. Smaller particles are dealt with as follows: The serrated cylinder C is nested within a second cylinder C_1 with a plain bore and serrations on its outer surface. Between the serrations of cylinder C and the surface of the outer cylinder there is a clearance of a few thousandths of an inch, through which the oil is forced, so that particles of 0.005 in. diameter and over are retained. The normal flow of oil through the filter is said to have a scouring effect, dislodging these particles and directing them toward the sump. This is the first filtering stage.

Oil passing the filtering edges of the first stage flows into a series of adjoining channels in cylinder C. These channels are closed at their lower end but have communication by drilled holes F with a second series of channels, in the outer serrated cylinder C_1. Here minute, oil-held particles are dealt with in the same manner as described for the first stage in the foregoing. The outer series of channels alternately communicate with the sump and with the upper chamber of the filter. Oil passing upwards is discharged through outlet port H. The cylindrical casing G forms one "edge" of the outer series of filtering spaces. It should be noted that prior to filtration the flow is always in a downward direction, toward the sump, and it is claimed that the oil stream thoroughly scours the filtering edges and projects impurities into the sump, thus providing a self-cleaning action. All filtered impurities are removed through an opening in the sump normally closed by plug J.

To clean the filter, plug J is removed and the oil is allowed to drain off. Alternately, the filter may be flushed with oil which is admitted through the outlet connection and discharged through the drain-plug opening. The manufacturers advise against taking the filter apart for cleaning purposes, as this would make it possible for small particles of grit to lodge on the delivery side of the filtering edges.

Reo Adds Two Cab-Over Engine Chassis

REO MOTOR CAR CO. has added two cab-over engine models to its line of trucks, known as Model 1D4M and Model 2L4M respectively. Of these the former has a load rating of 1½ tons and a gross-weight rating of 11,500 lb. The wheelbase is 166 in. and the loading space 14-15 ft., depending on the length of the cab used. The chassis price is $1,045. The 2L4M is a larger edition of the same mechanical design, but details are lacking at present.

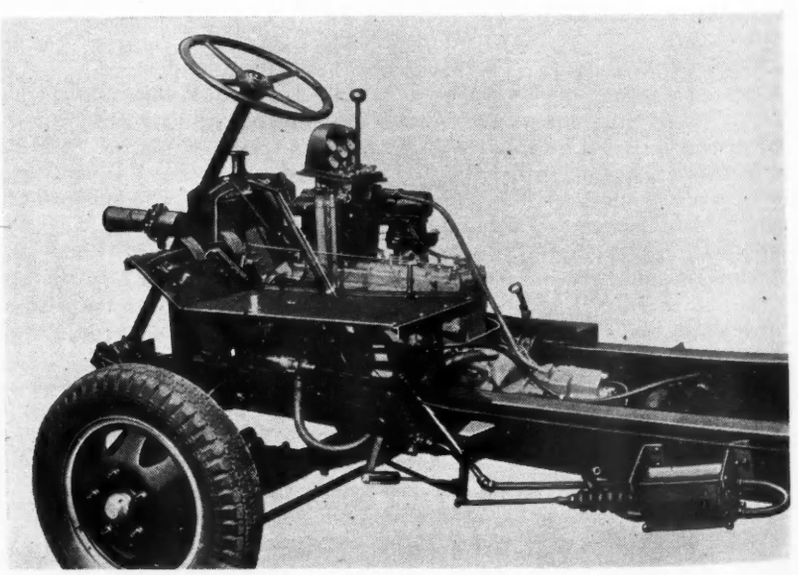
With a full rated load, 35 per cent of the total weight is on the front axle and 65 per cent on the rear axle. Sixty per cent of the pay load is carried ahead of the rear axle.

This new model is powered with a 230 cu. in. Reo Gold Crown engine having a maximum torque of 125 lb.ft. and a maximum horsepower of 68 at 2800 r.p.m. Seven main bearings carry the crankshaft. Pistons are of the Lo-Ex, T slot, cam-ground type. The engine is fitted with a down-draft carburetor.

Three optional gear ratios are being offered, viz., 5.28, 5.83 and 6.6. The low-speed ratio of the four-speed transmission is 6.72. The balanced drive shaft incorporates two needle-bearing universal joints, and the driving pinion of the full-floating rear axle is straddle-mounted. Steering is by a cam-and-lever gear.

The four-wheel hydraulic brakes, with a total braking area of 246 sq. in., are operated by a vacuum booster. The tire size is 7.00/20, with duals in the rear. A 70½ in. front axle tread insures a short turning radius. A 38-gal. gasoline tank is mounted on the left side of the frame.

The entire powerplant together with the radiator can be slid out for service operations. There are two tubular cross members to give torsional rigidity to the frame, one located ahead of the radiator and the other behind the transmission. The cowling, which covers the engine in the cab, is insulated by a double thickness of asbestos. There is an air space between the cowling and the top of the engine hence the cab is protected from engine heat.



Powerplant arrangement of Reo "camel-back" 1½-ton truck

AUTOMOTIVE ABSTRACTS

Efficiency of Cable Controls

SOME tests on the efficiency of transmission of that type of control mechanism known under the names of Bowden and Arens were made in England recently. According to a long-established mechanical pripciple, if T_1 and T_2 represent the pulls on the two ends of a cable passing through a curved sheathing,

$$T_1/T_2 = e^{\mu\theta}$$

where e is the base of the Naperian system of logarithms, μ, the friction coefficient between cable and sheathing, and θ the arc in radians formed by the sheathing. This equation assumes perfect flexibility of the cable and wrapping element, and therefore does not involve the radius of curvature of the "pulley" surface.

In two initial experiments the arc of contact was made 180 deg. The sheath was bent into a semicircle of 9-in. radius, and a weight was hung on each end of the cable. In one set of experiments the sheath was fixed at the ends only, leaving the intervening part free to yield; in another the sheath was firmly clamped over its entire length.

TABLE I—*Free Sheath*

T_2 lb.	T_1 lb.	$T_1/T_2=e^{\mu\pi}$	μ	Efficiency Per Cent
5	8.0	1.60	0.1495	62.5
10	15.5	1.55	0.1395	64.5
15	23.0	1.53	0.136	65.2
20	30.5	1.525	0.134	65.5
25	38.0	1.520	0.133	65.8
30	45.5	1.516	0.132	66.0

TABLE II—*Sheath Rigidly Supported*

T_2 lb.	T_1 lb.	$T_1/T_2=e^{\mu\pi}$	μ	Efficiency Per Cent
5	8.15	1.63	0.1555	61.3
10	15.75	1.575	0.1445	63.7
15	23.25	1.55	0.1393	64.5
20	30.75	1.537	0.1368	65.0
25	38.50	1.540	0.1373	64.9
30	46.00	1.533	0.1358	65.2

CABLE CONTROLS.

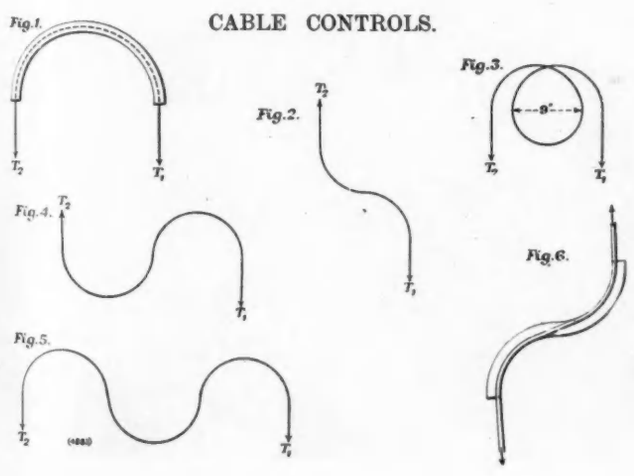


Table I gives the results for the free sheath and Table II those for the rigidly held sheath. Fig. 1 shows diagrammatically the method of test; weights of 5 lb., 10 lb., etc., up to 30 lb. were hung on one side and on the other side enough weights were applied to cause sliding to begin.

It will be seen that the efficiency increases as the load increases, but only very slightly. The coefficient of friction appears to decrease and this is due to the flexural stiffness of the cable, which causes pressure against the sheath. When $T_2 = 0$, for example, T_1 is about 0.6 lb. The effect of the rigid support is almost negligible.

The remaining experiments were carried out on semicircles of 9 in., 6 in. and 3 in. radii, and on quadrants of the same curvature. Various loops of continuous and anticlastic curvature were tried and the results are summarized in Table III, which gives values corresponding to a small tension T_2 of 20 lb.

TABLE III—($T_2 = 20$ *lb.*)

Arrangement of Cable	T_1 lb.	μ	Efficiency Per Cent
Semicircle, 9 in. radius..	30.50	0.134	65.5
Semicircle, 6 in. radius..	31.25	0.142	64.1
Semicircle, 3 in. radius..	32.00	0.149	62.5
Quadrant, 9 in. radius...	26.00	0.165	77.0
Quadrant, 6 in. radius...	26.00	0.165	77.0
Quadrant, 3 in. radius...	26.00	0.165	77.0
3 Semicircles, Fig. 2, 4½ in. to 6 in. radius.....	66.00	0.130	30.6
Reversed semicircles, Fig. 3, 3 in. radius	44.50	0.127	45.0
Reversed quadrants, Fig. 4, 3 in. radius	30.50	0.134	65.70
3 Reversed semicircles, Fig. 5, 3 in. radius....	59.00	0.115	34.00

The fact that with reversed curves the coefficient of friction is apparently reduced may be explained by the fact that the cable is smaller than the sheath and thus, when passing from one curve to the reverse, the wrapping angle is diminished as shown in Fig. 6, where the cable is made very much smaller than the sheath for clearness sake.—H. S. Rowell in *Engineering* of March 29.

Test of Paxman-Ricardo High-Speed Oil Engine

AN independent test of a Paxman-Ricardo four-cylinder heavy oil engine rated at 40 hp. at 1000 and 60 hp. at 1500 r.p.m. was made by W. A. Tookey, the principal object of the tests being to compare the performance of the engine with performances of alternate designs. The engine has 4⅝ by 5⅞-in. cylinders (394 cu. in. total displacement), and the rating is based on a b.m.e.p. of 80 lb. per sq. in.

From motoring tests conducted previously, the full-load fluid and mechanical resistances at 1000 r.p.m. were ascertained to be the equivalent of 24 lb. per sq. in. mean piston pressure. A full-load b.m.e.p. of 80 lb. per sq. in. can therefore be taken to be the equivalent of 104 lb. per sq. in. i.m.e.p., and, the mechanical efficiency being 77 per cent, calculation shows that 40 hp. at the brake is equal to 52 i. hp. At 16 lb. per hr. the rate of fuel consumption was 0.308 lb. per i. hp-hr. and 0.40 lb. per b. hp-hr. The former, with a calorific value of 19,728 B.t.u. per lb., represents a thermal efficiency of nearly 42 per cent.

At 1000 r.p.m. a maximum of 25 per cent above rated load was obtained from the engine with clear exhaust, the b.m.e.p. then being 100 lb. per sq. in., the specific fuel consumption 0.417 lb. per b. hp-hr., and the exhaust-manifold

(*Turn to page* 778, *please*)

Chevrolet Equipment Assembles per Hour for Front End

by Joseph Geschelin

WITH the ever growing applications of needle bearings or quill bearings, as they are variously described, there is a lot of interest in automatic or semi-automatic methods of assembing rollers in their retainers. This is an important point because the overall economy of these applications depends not only upon low first cost of the rollers but also upon inexpensive assembly procedure.

Chevrolet was one of the first to install special assembly machines for this purpose and today has a battery of five machines, one for each type of application on the knee-action front end assembly unit. Several of these machines have been installed only within the past month or so and represent the last word in a process which is only about a year old.

Through the courtesy of the Chevrolet Gear and Axle plant management we show here several of the machines mentioned above. Fig. 1 shows the equipment used to assemble rollers for the upper and lower king pin bearings. This machine, one of the first in the field, has a double magazine feed, the rollers being fed down the inclined tracks and feeding alternately from one side and then the other into the single vertical track.

In operation, the cam shown in the foreground operates the feeding of rollers from one dial or the other through the lever which follows the cam contour. Directly above the cam lever is a hammer which periodically strikes an anvil on the vertical section of the track and thus keeps the rollers moving. Note that the rollers move down progressively on short inclined tracks, this device being employed to prevent rollers from cocking sidewise and clogging the feed.

Rollers come down the track and collect in an annular space at the lower end and when the space is filled the magazine feed automatically stops. This assembly takes 32 rollers. The machine can produce upwards of 250 sets per hour with one operator.

The group of rollers comprising an assembly is ejected into a mandrel which is held up against the assembly head by means of the fixture shown on the table. Loaded mandrels are shown in the outer rack at the right; empties ready for loading are on the inner rack. The close-up in Fig. 2 shows a view of the holding fixture with the locating pin in the center; also a roller

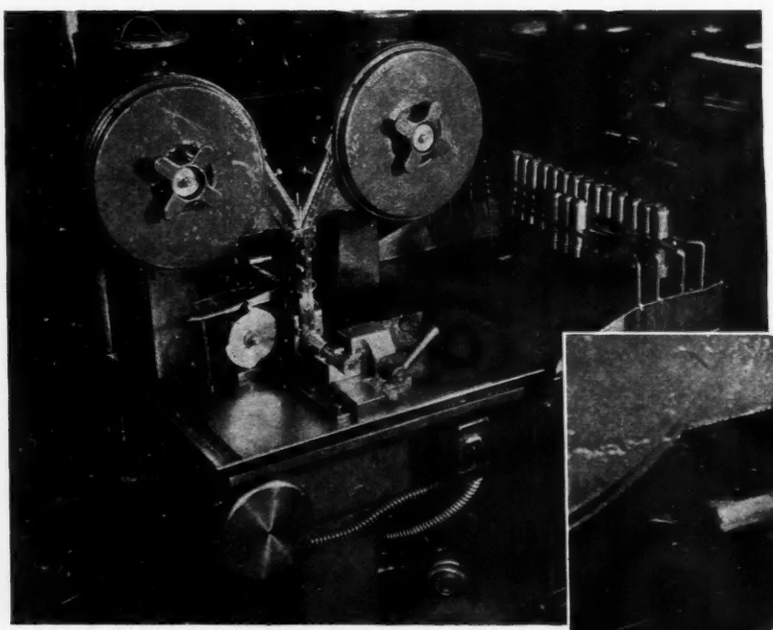


Fig. 1. Double dial magazine feed machine for the assembly of rollers. This one handles 250 assemblies per hour of 32 rollers per assembly. The cam and lever mechanism is used to shift the feed of rollers alternately from one dial to the other.

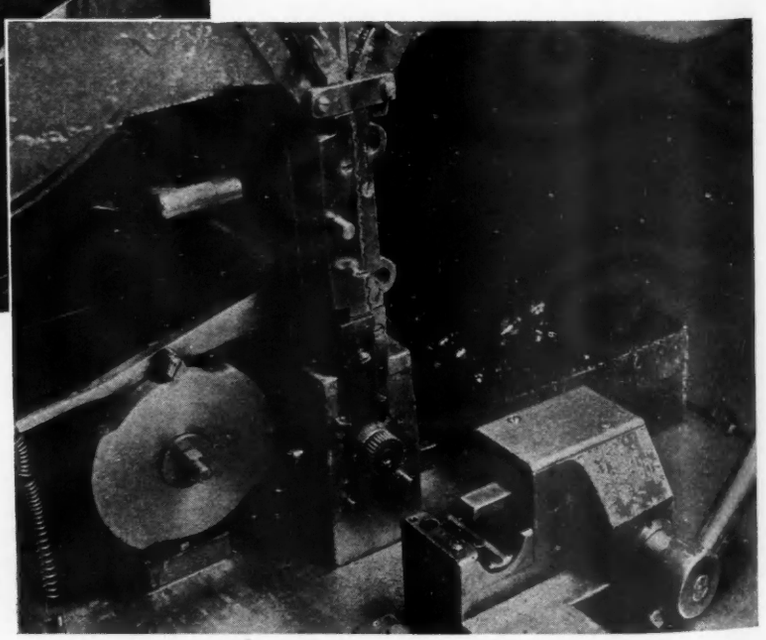


Fig. 2. Close-up of machine in Fig. 1 showing the detail of the magazine rack, cam, hammer, and fixture. A partly ejected group of rollers is seen here.

250 Sets of Quill Bearings Knee-Action Units

Detroit Technical Editor
Automotive Industries

assembly partly ejected. The cam and hammer may also be seen rather plainly.

Finally, the loaded mandrels are taken over to the front end assembly line which may be seen at the extreme right, and the rollers injected into the retainer by pressing on the lower end of the tool.

A similar machine and procedure are used for the assembly of the wheel support arm shaft bearings, which take 42 rollers, at the rate of about 250 assemblies per hour.

One of the newly acquired machines in this department is shown in Fig. 3. It has a simple feed mechanism with only one dial and a single magazine track. This machine does not require the cam and lever switching described above. The hammer used for maintaining the downward movement of rollers is plainly seen at the lower left.

This machine supplies roller assemblies of 32 rollers for the wheel support arm lever, shown on the table. Here the rollers are ejected directly into the retainer which consists of the bore in the lever with the ground pin forming the inner race. The fixture in the foreground holds the lever; the ground pin comes through by the process of dropping it into the slot in the top of fixture and pressing in by means of the shaft at the end of the fixture.

A very interesting sidelight of this development is that the two big machines in Fig. 4 are needed to permit the uninterrupted operation of the battery of little assembly machines. The function of the large machines is to dry the surface of rollers after cleaning so that they will move freely in the magazines of the assembly machines. In operation, the rollers are dropped into a hopper located on the second cross bar on the front of the unit, and are fed down a chute into the long cylinder mounted at the bottom. As the rollers drop into the cylinder they come in contact with a stream of a special sawdust fed from above.

The cylinder has a long-pitch screw which works the mixture of rollers and sawdust toward the rear or outlet end, and as the mixture approaches the outlet a strong suction draws out the sawdust leaving the rollers perfectly clean. The entire upper part of the unit houses the sawdust storage and blower and suction mechanism.

Assembly machines and the cleaning units are built by Rehnberg-Jacobson Mfg. Co., Rockford, Ill.

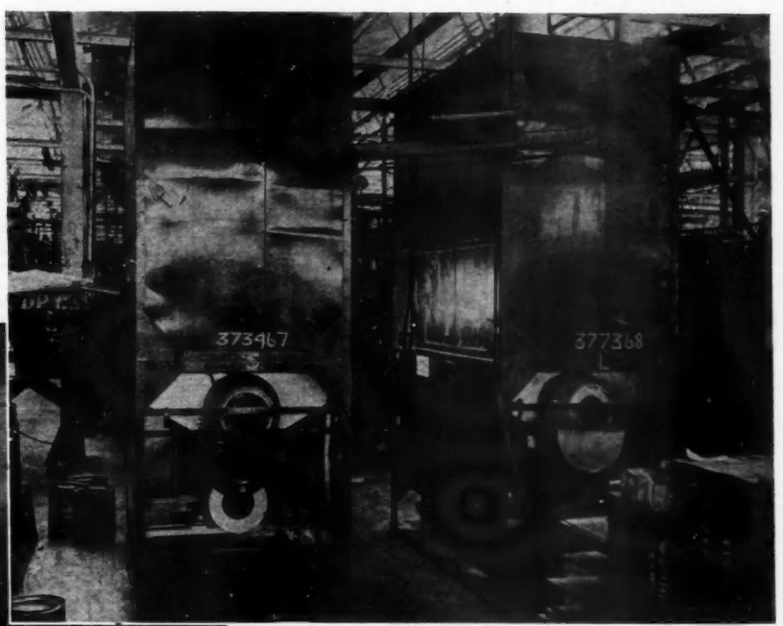


Fig. 4. Two big units required to dry the rollers in preparation for the assembly machines.

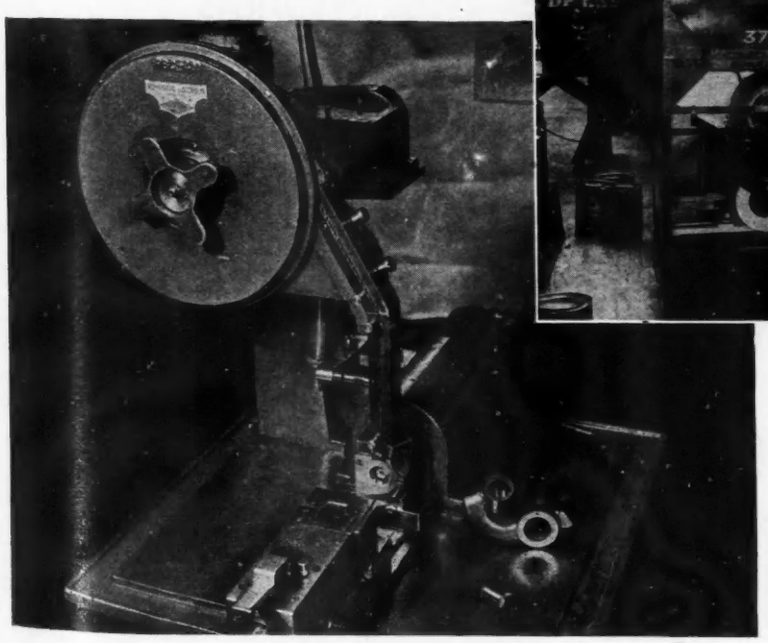


Fig. 3. One of the machines recently installed at Chevrolet has only one dial magazine feed. This has no cam and lever mechanism and requires only the hammer for keeping the rollers in motion.

New Truck Registrations

	April, 1935	March, 1935	April, 1934	Four Months 1935	Four Months 1934	Per Cent Change 4 Mos., 1935 over 1934	Numerical Change 4 Mos., 1935 over 1934	Per Cent of Total Four Months 1935	Per Cent of Total Four Months 1934
Ford	17,943	16,805	13,167	62,338	34,908	+78.5	27,430	39.50	29.05
Chevrolet	15,024	13,744	15,050	50,336	49,797	+1.0	539	31.89	41.45
Dodge	5,708	4,284	4,367	18,404	13,825	+33.0	4,579	11.66	11.51
International	4,554	3,673	2,729	14,914	10,004	+14.9	4,910	9.45	8.33
G. M. C.	870	850	839	3,148	2,564	+23.0	584	1.99	2.13
Diamond T	568	534	534	2,151	1,861	+15.7	290	1.36	1.55
Reo	449	389	527	1,510	1,616	—6.4	—106	.96	1.35
White	285	244	494	1,014	1,389	—26.8	—375	.64	1.16
Federal	177	132	178	574	589	—2.5	—15	.36	.49
Studebaker	189	135	123	558	456	+22.3	102	.35	.38
Mack	159	100	206	436	656	—33.5	220	.28	.55
Willys-O.	152	138	2	368	11	+3245.0	357	.23	.01
Brockway	109	67	104	316	393	—19.6	—77	.20	.33
Autocar	79	56	88	247	289	—14.5	—42	.15	.24
Stewart	62	60	90	198	278	—28.7	—80	.12	.23
Terraplane	90	34	23	168	41	+310.0	127	.11	.03
Henny	66	27	15	117	57	+105.5	60	.07	.05
Austin	14	30	73	113	287	—60.6	—174	.07	.24
Buick	21	22	14	83	44	+88.7	39	.05	.04
Indiana	24	14	64	78	262	—70.2	—184	.05	.22
F. W. D.	14	15	13	74	43	+72.0	31	.05	.04
Sterling	31	14	4	65	37	+75.8	28	.04	.03
Divco	15	12	5	59	64	—7.8	—5	.04	.04
Miscellaneous	182	132	173	583	674	—13.5	—91	.38	.55
Total	46,785	41,511	38,882	157,852	120,145	+31.5	37,707	100.00	100.00

U. S. New Car Registrations and Estimated Dollar Volumes by Retail Price Classes—First Four Months*

	UNITS					ESTIMATED DOLLAR VOLUME				
	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934
Chevrolet, Ford and Plymouth	627,710	400,671	+57.0	70.68	72.56	$398,200,000	$248,000,000	+60.5	63.86	63.45
Others under $750	120,526	38,287	+215.0	13.57	6.93	86,600,000	26,800,000	+223.5	13.89	6.83
$751-$1,000	112,375	83,830	+34.0	12.65	15.18	95,200,000	69,000,000	+38.0	15.27	17.65
$1,001-$1,500	19,245	20,442	—5.8	2.17	3.70	23,300,000	25,000,000	—6.9	3.74	6.40
$1,501-$2,000	3,931	4,247	—7.4	.44	.77	6,500,000	7,500,000	—13.4	1.04	1.92
$2,001-$3,000	2,780	3,464	—19.6	.31	.63	7,600,000	9,600,000	—20.8	1.22	2.46
$3,001 and over	1,497	1,250	+19.8	.18	.23	6,200,000	5,000,000	+24.0	.98	1.29
Total	888,064	552,191	+60.8	100.00	100.00	$623,600,000	$390,900,000	+59.8	100.00	100.00
Miscellaneous	315	125	+152.0							
Total	888,379	552,316	+60.9							

*All calculations are based on list price F.O.B. factory of the five passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.

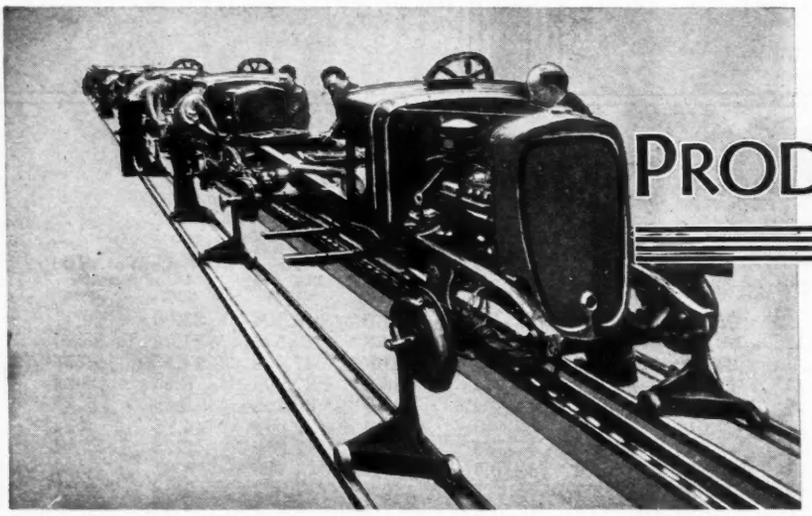
New Passenger Car Registrations

	April, 1935	March, 1935	April, 1934	Four Months 1935	Four Months 1934	Per Cent Change 4 Mos., 1935 over 1934	Numerical Change 4 Mos., 1935 over 1934	Per Cent of Total Four Months 1935	Per Cent of Total Four Months 1934
Ford	105,479	94,986	61,986	311,728	162,824	+91.6	149,904	35.09	29.47
Chevrolet	75,083	55,733	63,501	186,901	146,371	+27.8	40,530	21.04	26.49
Plymouth	42,707	34,615	34,295	129,081	91,576	+41.0	37,505	14.53	16.58
Dodge	20,302	17,506	11,527	58,138	31,134	+86.9	27,004	6.54	5.64
Oldsmobile	17,661	14,755	8,916	46,089	15,824	+191.0	30,265	5.19	2.86
Pontiac	16,038	13,449	9,612	44,088	23,440	+87.9	20,648	4.96	4.24
Buick	6,952	5,393	6,453	20,236	17,358	+16.6	2,878	2.28	3.14
Terraplane	6,156	4,589	5,810	17,024	12,565	+35.5	4,459	1.92	2.27
Chrysler	5,204	4,283	3,529	14,057	6,113	+130.0	7,944	1.58	1.11
Studebaker	4,527	3,304	4,891	12,631	13,525	—6.6	—894	1.42	2.45
DeSoto	3,084	2,583	1,381	8,386	3,031	+176.5	5,355	.94	.55
Hudson	2,544	1,844	3,169	6,969	6,281	+11.1	688	.78	1.14
Lafayette	1,917	1,216	250	4,794	448	+970.0	4,346	.54	.08
Graham	1,891	1,323	1,838	4,710	4,103	+15.0	607	.53	.74
Nash	1,748	1,212	1,501	4,596	5,333	—13.6	—737	.52	.96
Packard	3,236	928	646	4,943	1,708	+189.5	3,235	.56	.31
Willys	952	974	415	2,830	1,601	+77.0	1,229	.31	.29
Hupmobile	947	795	516	2,734	1,381	+98.0	1,353	.31	.25
LaSalle	1,379	500	782	2,652	1,036	+156.0	1,616	.30	.19
Auburn	564	482	373	1,955	1,225	+59.8	730	.22	.22
Cadillac	541	433	672	1,587	1,753	—9.5	—166	.18	.32
Reo	411	317	261	1,150	913	+26.0	237	.13	.17
Lincoln	192	142	236	562	663	—15.2	—101	.06	.12
Pierce-Arrow	75	59	189	223	530	—58.0	—307	.03	.10
Miscellaneous	62	56	301	315	1,730	—81.8	—1,415	.04	.31
Total	319,652	261,477	223,050	888,379	552,466	+60.9	335,913	100.00	100.00
Chrysler Corp.	71,297	58,987	50,732	209,662	131,854	+59.0	77,808	23.59	23.88
Ford & Lincoln	105,671	95,128	62,222	312,290	163,487	+91.0	148,803	35.15	29.59
General Motors	117,654	90,263	89,936	301,553	205,782	+46.9	95,771	33.95	37.24
All others	25,030	17,099	20,160	64,874	51,343	+26.4	13,531	7.31	9.29

U. S. New Car Registrations and Estimated Dollar Volumes by Retail Price Classes—April*

	UNITS					ESTIMATED DOLLAR VOLUME				
	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934
Chevrolet, Ford and Plymouth	223,269	159,682	+40.0	69.86	71.65	$142,100,000	$101,200,000	+40.3	63.02	62.66
Others under $750	44,045	6,673	+560.0	13.78	2.99	31,700,000	4,500,000	+605.0	14.06	2.79
$751-$1,000	41,197	44,864	—8.1	12.89	20.13	34,900,000	36,900,000	—5.4	15.48	22.85
$1,001-$1,500	7,964	8,013	—0.5	2.49	3.60	9,400,000	10,100,000	—6.9	4.17	6.25
$1,501-$2,000	1,660	1,890	—12.1	.52	.85	2,700,000	3,400,000	—20.6	1.20	2.10
$2,001-$3,000	958	1,266	—24.3	.30	.57	2,600,000	3,500,000	—25.7	1.15	2.17
$3,001 and over	497	480	+3.5	.16	.21	2,100,000	1,900,000	+10.6	.92	1.18
Total	319,590	222,868	+43.4	100.00	100.00	$225,500,000	$161,500,000	+39.8	100.00	100.00
Miscellaneous	62	32	+93.9							
Total	319,652	222,900	+43.3							

*All calculations are based on list price F.O.B. factory of the five passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.



PRODUCTION LINES

Rubber-to-Metal

Just saw how U. S. Rubber fabricates its line of rubber-to-metal parts, so extensively used in automotive manufacture. Now that some cars use upwards of 60 pounds of rubber in this form, this operation assumes more than usual importance. We have learned, for instance, that the chemical composition of the metal used for highly stressed applications is a very fussy consideration. Also that many different types of metals may be bonded successfully, if you know how. Back of it all is a painstaking system of control of plating baths, metal surface, rubber composition. Production here also features 100 per cent inspection of finished product.

Tri-Dimensional

According to news reports Dr. J. E. Shrader of Drexel Institute has invented a tri-dimensional vibrograph for which he is getting a medal from Franklin Institute. The instrument is portable, simple to operate, and should be of great value in the study of complex vibrations.

Metallurgy

Very soon we will be able to tell you about a new material—copper base—that has attracted unusual attention in important quarters. It has many applications in car construction although it was intended by its makers for an entirely different purpose.

Red Arrow

Hudson, you gave us quite a thrill the other day. Here we were eating in the Red Arrow diner bound for the East when up pops a shiny green Hudson eight sedan. It kept abreast of the train and seemed bent on leaving it behind were it not for the few cars on the road that apparently forced our Hudson to slow down to 70.

Steering Wheel

Did you ever see a steering wheel made? We marveled at the process of producing the hard rubber surface. It starts with a metal core made by welding bent strips into the required frame. This is shrouded with molded strips of live rubber, cured in molds under pressure. Then it is trimmed, polished in successive steps, and buffed to a high finish. We'll be able to show you how pretty soon.

Anent Pistons

There is a certain buzz of excitement about town concerning an unusual piston design that's going through its trial stages. The originating car builder, of course, is not in position to say anything for a long time to come or at least until the design has been given the seal of doom or approval. It's a dead secret but for the fact that everybody is talking about it. There will be quite an air of suspense until the thing is settled one way or another.

Double-Action

One of the old-timers of the engineering fraternity has developed a double-acting, four-cycle engine which in his opinion is the answer to conventional and rear drive streamlined jobs. It can be built in-line or Vee, presumably in much smaller sizes and weights for the same horsepower. And it's air cooled.

Wheels, Wheels

On the recent Ford Sunday concert featuring Richard Crooks, W. J. Cameron took as his theme, "Wheels, an index of human progress." All industrial and scientific advance has come about as a result of the adaptation of the wheel. Those who have criticized the modern industrial system can reduce the entire civilized world, as it is constituted today, to a state of barbarism simply by eliminating the wheel. Is that the object of some of our current crop of reformers, or is it that many people don't understand what makes the wheels turn?

Solder

We mentioned elsewhere recently that Seaman body is fabricating all-steel bodies without the use of solder for repair. Only body specialists can appreciate what a saving this represents on an output of from 200 bodies and up per day. Yet it is possible to duplicate such performance anywhere by careful attention to the welding die design—clamping of the work, fitting of sheet metal ends, alignment of edges, etc.

What P. F.

Some people are inclined to pooh-pooh the matter of power factor as it concerns heavy duty welding machines. That low power factor is bad for the local power company is beside the point at the moment. It has been shown that the investment in welding equipment can be greatly reduced by giving p. f. more thought.

J. G.

MANUFACTURING MANAGEMENT METALLURGY

The Need and Opportunity for Further Mechanization

STUDIES as to the extent, effect and possible development of mechanization in industry are being made by the National Industrial Conference Board for the National Machine Tool Builders' Association. The particular study that is now under way is based on an investigation of the power used per wage earner in 14 different industries which include practically all types of manufacturing activity. A preliminary report on the study which has just been released offers further supporting evidence for conclusions developed in the articles "Men AND Machinery" which have recently been published in *Automotive Industries*.

The table on this page shows the growth of mechanization since the turn of the century among the manufacturing industries included in the survey. The report of the National Industrial Conference Board points out that although there is considerable fluctuation in the number of factories operating during the 30 years 1899-1929, there is no particular long-time movement noticeable. In 1929 there was approximately the same number of factories in the United States as in 1919 or in 1899. The increased output of the manufacturing industry was not, therefore, brought about by spreading the work over more plants, but it was the result of an increase in the capacities of existing establishments.

This increased capacity was effected by the employment of more labor and capital in the operation of these plants. During the 20 years ending in 1919 the wage-earners attached to the manufacturing industries had grown to over 9,000,000 workers, or a little less than twice the number of workers found in these industries in 1899. From 1919 to 1929, despite a 15 per cent increase in our population, there was a small shrinkage in the labor force of the manufacturers. Nevertheless, there were approximately 42 workers per plant in 1929, as compared with only 23 wage-earners per plant in 1899.

No check, however, in the movement toward greater use of machinery is noticeable during the entire 30-year period. Capital equipment, so far as it can be measured by "total horsepower installed," increased from about 10,000,000 horsepower installed in 1899 to more than four times that amount by 1929. Since the number of plants had remained fairly constant throughout this period, the manufacturing industries employed more than four times as much horsepower per plant at the end of the period as at the beginning of it; each worker used on the average almost twice as much machinery in 1929 as in 1899. In other words, capital was more and more utilized as a means of increasing the productivity of industry. This becomes especially clear during the last ten years under discussion, when, despite the decrease in the number of wage-earners, the greater use of machines produced a total physical output 40 per cent greater than that in 1919.

The installation of machines did not create unemployment, but made possible the release of wage-earners for work in other occupations. Labor so redirected into other channels was subject to less burdensome work, as it went in a large measure into clerical, trade, and other less burdensome occupations. Furthermore, it is probable that the tasks performed by the workers remaining in the manufacturing industries demanded a continually diminishing degree of energy and effort because of the introduction of mechanical devices.

Neither the degree of mechanization nor its rapidity of growth are uniformly distributed throughout manufacturing industries. In 1914 the paper and allied products industries employed 10.2 horsepower per wage-earner, or ten times as much as the leather industry with one horsepower per wage-earner. Both these industrial groups retained the same position through to 1929, the former being the most mechanized and the latter the least mechanized. The most rapid growth of mechanization took place in the chemical industry, where the ratio of horsepower per worker more than doubled within the period 1914-1929 and which by now is the second most mechanized industry in the manufacturing group.

From this analysis it becomes apparent that mechanization is not as widespread as many people are prone to believe. Of the 14 industries studied, 9 have less than five horsepower per worker, whereas the remaining 6 do not average in excess of nine horsepower per worker. It seems rather encouraging for the future, and a challenge to the machine-producing industries further to develop the machine in order to bring about a greater and more uniform use of mechanical devices as a means of increasing the output per worker employed by industry and thus raising the standard of living.

Growth of Mechanization in Manufacturing Industries, 1899-1929

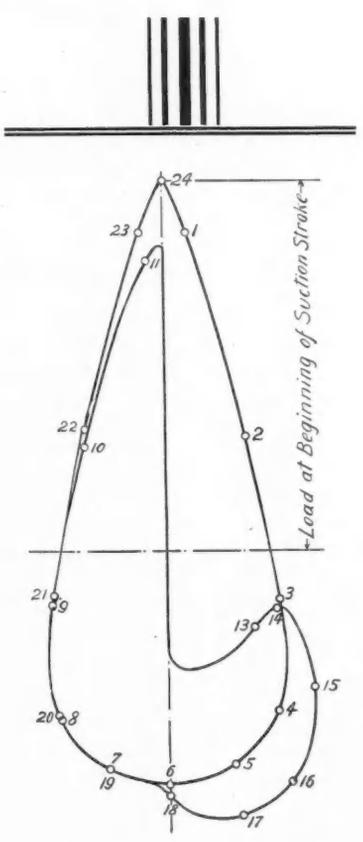
	Number of Establishments	Average Number of Wage-Earners	Total Horsepower Installed	Total Horsepower per Establishment	Total Horsepower per Wage Earner
1899	207,514	4,712,763	9,960,980	48	2.11
1904	145,033	5,362,030	13,296,394	92	2.48
1909	175,142	6,472,616	18,551,737	106	2.87
1914	177,110	6,896,190	22,290,899	126	3.23
1919	214,383	9,000,059	29,327,669	137	3.26
1923	196,309	8,778,156	33,094,228	169	3.77
1925	187,390	8,384,261	35,772,628	191	4.27
1927	191,866	8,349,755	38,825,681	202	4.65
1929	210,959	8,838,743	42,931,061	204	4.86

Rising Engine Speeds Lift Bearing Loads to 1200 Lb.

INCREASING engine speeds have resulted in an increase in bearing loads generally, and in some cases have raised the loads on connecting-rod big-end bearings to such an extent that unusual means had to be adopted to prevent failure in service. With increase in speed, the frictional losses in the bearings are increased, and more heat is generated. This leads to an increase in the temperature of the oil in the bearing, and the oil becomes thinner and less able to sustain bearing loads, which latter also increase with speed. To reduce the likelihood of bearing failure at high speeds, oil-temperature regulators were introduced some years ago, and during the past year or two a number of manufacturers have replaced the usual babbitt-metal linings with linings of a material which does not weaken so much at the maximum temperatures reached in service. Both of these developments indicate that the practical limits of bearing loading have been very closely approached.

That the connecting-rod bearing is more susceptible to damage from overheating is undoubtedly due to the fact that it has to take the whole of the load due to inertia force and gas pressure in one of the cylinders, while each main bearing takes only a part of this load.

The question was brought up recently as to what are the bearing loads actually allowed in the design of connecting-rod bearings, or the loads which these bearings have to sustain in service. In the earlier years of the industry it was the practice to base the projected bearing area on the maximum explosion pressure likely to be developed in the cylinder. With modern, high-speed engines this practice is not very logical, however. Of course, when an engine turns over under full throttle at relatively low speed, the maximum load on the bearing occurs at the moment of explosion in the cylinder; but at low speed little heat is generated in the bearings, and bearings never burn out under these conditions. A different type of failure frequently occurs in the crankpin bearings of high-speed Diesel engines, the babbitt lining cracking at the center portion of that half of the head which is integral with the shank. This is undoubtedly due to excessively high combustion pressure or an excessively rapid rise of this pressure. But such engines are not being considered in this article.



Typical crankpin-bearing load diagram

At high speeds the bearing load due to gas pressure at the moment of explosion and that due to the inertia and centrifugal forces on the moving parts are in opposition, and the load on the bearing is actually greater at the beginning of the suction stroke than during the early part of the explosion stroke. Also, at speeds in the neighborhood of the peaking speed, inertia and centrifugal forces play a much more important part in bearing loads than the gas pressure, and at any given speed in this range the average bearing load throughout the cycle is greater when the engine runs without load than when it carries the maximum load possible at that speed.

The method of calculating the total bearing loads for, say, 24 equidistant points of the cycle and plotting the results in the form of a polar diagram is well known. This method is rather laborious, however, when it is desired to analyze a number of engines with respect to their specific bearing loads; and the question then arises whether it is really necessary to plot such diagrams and determine the mean value of the bearing load throughout the cycle, or whether the maximum bearing load, which occurs at the beginning of the suction stroke, will not serve just as well as a criterion.

It should be remembered in this connection that as long as there is a continuous film of lubricant on the bearing surfaces, bearing load is not a factor in the rate at which heat is generated on the bearing surfaces. This rate of heat generation per unit of bearing surface is determined principally by the rate of shear in the oil film, that is, the rubbing speed, and by the viscosity of the oil in the film. However, before failure occurs the oil film has been disrupted and flood lubrication has been replaced by what is known as boundary lubrication, under which condition the specific load on the bearing does play a part in the rate of heat generation.

Fig. 1 herewith shows a typical load diagram for a crankpin bearing. These

Average Big End Per Square Inch

by P. M. Heldt
Engineering Editor,
Automotive Industries

load diagrams have very much the same form for practically all engines. The factors which determine the crankpin bearing load at any particular point of the cycle are the total gas pressure, reciprocating weight, rotating weight, stroke, connecting-rod length and speed of rotation. The centrifugal force on the lower end of the connecting rod gives a circular load diagram, and the greater the weight of the lower end of the rod the "fatter" the diagram will be. In preparing the diagram, one-third of the connecting-rod weight was taken as reciprocating and two-thirds as rotating weight.

In the diagram shown, if the average load throughout the cycle of two revolutions is made 100, the maximum instantaneous load (at the beginning of the suction stroke) is 171; the average bearing load during the exhaust and suction stroke is 106, and the average during the compression and expansion strokes, 94. Thus when there is no appreciable gas pressure in the cylinder the bearing load is higher than when the gas pressure is at the maximum.

Gas pressure and inertia forces act along the cylinder axis, and therefore produce bearing loads predominantly in the vertical direction. However, these loads are transmitted to the crankpin bearing through the connecting rod which, being linked at both ends, can transmit force only in the direction of its shank. This introduces a transverse or horizontal component. However, the principal part of the horizontal component of the bearing load is due to centrifugal force on the rotating part of the connecting rod, that is, the big end and the lower part of the shank, which force is at all times in the direction of the crank. The proportion between reciprocating and rotating weight varies considerably, depending mainly on whether aluminum or cast iron pistons are used. Of the twelve engines for which the bearing loads were determined, six have cast iron and six aluminum pistons. In the former the total reciprocating weight averages twice the weight of the rotating part of the connecting rod, while in the latter the ratio is only 1.46.

In view of the fact that failure follows breaking down of the lubricating film, which occurs when the specific pressure becomes too high for the sustaining power of the film, it would seem that the maximum bearing load is a better criterion than the mean bearing load, of the factor of safety of the bearing. The relative safety or reliability of the bearing, of course, is dependent also on a number of factors which cannot well be taken into account in any calculation, such as the rate of oil circulation and the facilities for oil cooling. The quality of the oil used, its freedom from grit, etc., and the surface condition of the shaft or journal are other conditions that are more or less indeterminate. It is therefore impossible to give a definite maximum bearing pressure and say that as long as the bearing pressure in the engine remains below this figure the engine is safe.

Rigidity also is an important factor in the capacity of the bearings, and in this connection the rigidity of both the crankshaft and the bearing hub counts. If either part is unduly frail, not the whole of the bearing surface will be useful, and failure is apt to start at that part of the bearing where the load is most intense. It has been customary for quite some years now to provide main bearings with very stiff caps, and more recently efforts are being made to stiffen the big ends of connecting rods in a similar way by providing the shell with circumferential stiffening ribs or flanges. Since these ribs also help to disperse the heat generated by friction in the bearing, they serve a double purpose. One practice prevalent in the earlier years of the industry, particularly abroad, that of milling away the central part of the bosses for the connecting-rod bolt, for the sake of lightness of revolving masses, has been thoroughly discredited, since the boss is of great help in keeping the bearing in shape under the variable loads to which it is subjected.

In the twelve engines covered by this analysis, the specific load on the crankpin bearing at the beginning of the suction stroke varies from 975 lb. per sq. in. to 1450 lb. per sq. in. The engine giving the latter figure is fitted with copper-lead bearings, so that it would seem that this value is too high for babbitt bearings. The average specific bearing load for all crankpin bearings is very close to 1200 lb. per sq. in. Both the lowest and the highest figures are from engines with aluminum pistons, and whether an engine has cast-iron or aluminum pistons therefore is not a dependable criterion of the intensity of its bearing loads, though whenever the weight of either the reciprocating or rotating masses is reduced, the bearing loads also are reduced.

To prevent any misunderstanding it may be pointed out that the bearing loads here referred to, which occur at the beginning of the suction stroke, are calculated by the equation

$$L = \frac{W_a n^2 l}{70480} + \frac{W_b n^2 l}{70480}\left(1 + \frac{1}{r}\right) \text{ lb.},$$

where W_a is the weight of the rotating mass supported on the crankpin (two-thirds the total weight of the connecting rod); W_b, the weight of the reciprocating mass, that is, the remainder of the weight of the piston and connecting-rod assembly; n, the engine speed in revolutions per minute; l, the length of stroke in inches, and r, the ratio of the center-to-center length of the connecting rod to the length of stroke.

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

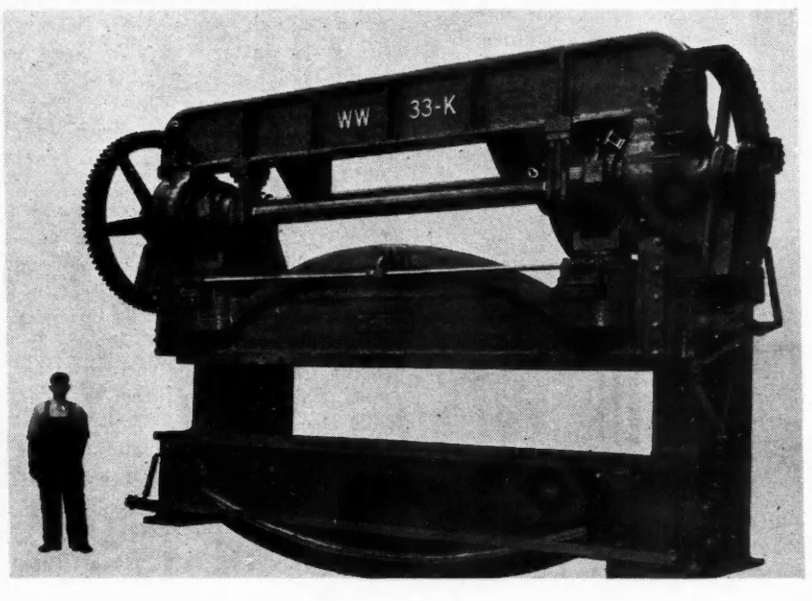
Williams, White Multiple Punch

Williams, White & Co., Moline, Ill., has just announced the No. 33-K multiple punch which is designed for a wide variety of work. With suitable dies, it is said that this machine may be used as a press brake, plate shear, straight line or group punching operations.

With slide elevated to its uppermost position, the machine will accommodate maximum clearance braking dies that make it possible to perform the same operations on this machine as on the conventional press brake. With the slide lowered to its lowest position, the machine will accommodate punching and shearing dies of conventional design without the use of filler bolsters.

The barrel type of adjustment is such that the adjusting screws are not subjected to any other strain than compression at any part of the stroke. The adjustment of the ram is motor driven and is of the self-locking type.

The press has capacity of 250 tons and weighs 92,000 lb. It is single-back geared with twin drive. It is equipped with a multiple-grip friction clutch which is engaged by air-operated foot treadle and is provided with an automatic stop at top of stroke. A hand engagement of the clutch is also provided for setting dies or for lowering the ram slowly to the work.



Cut-Off Machine and Grinder

The Cincinnati Electrical Tool Company, Cincinnati, Ohio, has just announced the addition of a combination cut-off machine and grinder, which is a small unit suitable for tool room cutting and grinding and also for cutting and grinding specimens for microphotography in research laboratories.

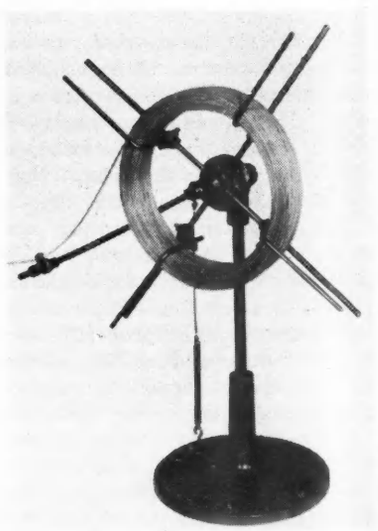
The machine carries a 10 in. x 1/16-in. abrasive cut-off wheel on the right-hand side, operating at a peripheral speed of approximately 9000 S.F.M. The material to be cut is fed into the wheel by means of a hand screw. The stock is held firmly on both sides of the cut, preventing wheel breakage, while a fully enclosed wheel guard affords protection to the operator. The vise or holding fixture may be tilted to give any angle desired up to 15 degrees. The machine will cut stock up to 1 in. size in approximately 15 seconds.

The left-hand side of the machine is equipped with an 8 in. x 1-in. grinding wheel with fully enclosed safety wheel guard adjustable to the wear of the wheel and with exhaust connection. An adjustable tool rest is mounted on the wheel guard.

The motor is 1 hp., fully enclosed, with the rotor shaft mounted on oversize ball bearings in dust-proof housings. A two-pole starting switch is entirely enclosed in the base of the motor. The machine may be had in either floor type, as shown, or bench type.

New Reel Mounted on Needle Bearings

A new No. 0 reel with an automatic brake, designed to hold coils weighing up to 100 lbs., has just been put



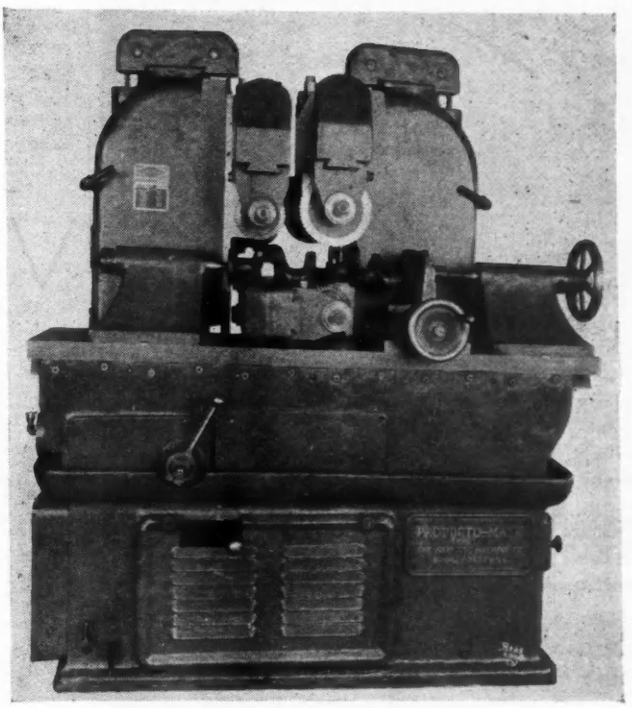
NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

on the market by the F. J. Littell Machine Company, Chicago, Ill. The reel is mounted on needle bearings to reduce friction while the automatic brake prevents the stock from unwinding too rapidly. When the stock is pulled forward the roller raises, releasing the automatic brake so that stock can be pulled without any resistance from the reel; but as soon as sufficient stock has been unwound the spring pulls down the roller and throws in the brake.

When fitted up with arms, the No. 0 reel will handle coils 9 in. inside diameter, 32 in. outside diameter, and 3½ in. wide. When fitted with plates this reel will handle coils 1¾ in. inside diameter, 32 in. outside diameter, and 3½ in. wide.

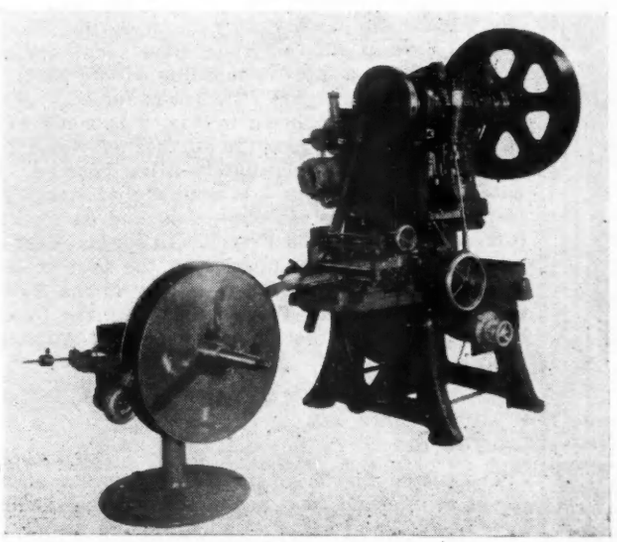
Producto-Matic Milling Machine

The Producto Machine Co., Bridgeport, Conn., has placed on the market the No. 125 Producto-Matic milling machine designed to mill 100 crankshafts per hour with one operator. The operation consists of milling six locating surfaces preparatory to turning. The work is mounted between centers and supported by rest blocks at both ends.



The machine is fully automatic, controlled by cams, producing a cycle which brings the cutter spindles in vertically while moving the table horizontally. The two upper cutter spindle bearings move downward into the work and the lower cutter spindle bearing moves upward. These are controlled by drum cams mounted within each of the housings carrying the cutter spindle bearings. The horizontal movement of the table is secured by a drum cam mounted within the bed of the machine. The reason for the two movements, i.e., the vertical movement of the cutters and the horizontal movement of the table, is to secure a square cut kept to close limits on each of the six locating surfaces.

Total weight of the machine is about 14,550 lb. Floor space required is 76 x 44 in.



Littell Introduces New Roll Feed

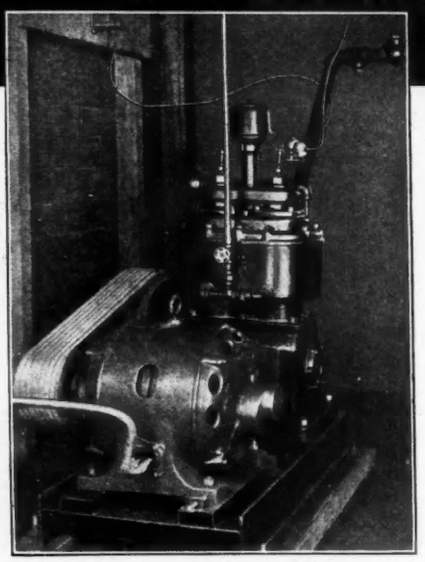
F. J. Littell Machine Co., Chicago, Ill., recently placed on the market an interesting roll feed which handles stock up to 16 in. in width and feeds up to 36 in. per stroke of press, at a speed of 92 strokes per minute. The stock is fed directly from a power driven reel which unwinds a loop of stock, thus permitting the roll feed to pull the stock from the loop only.

This press is driven by a U. S. Varidrive alternating current motor, the speed of which is controlled by a handwheel on the front of the press. The speed of the motor is regulated by hydraulic control with a range of speed from 50 to 150 r.p.m.

The feed is equipped with an automatic roll release which allows the operator to place the stock in the die just at the point where it is to be blanked. The first half feed of the rolls is killed so that the die blanks at exactly the point where the stock is placed.

"CURTIS COMPRESSOR enables one man to do the work of five"

*writes W. H. Placke, President, The Reliable Foundry Co., Dayton, O.



The Reliable Foundry Company uses air to operate chipping hammers, pneumatic grinding wheels and for sand blasting. Mr. W. H. Placke, President of the company, reports:

"Our Curtis Compressor enables one man with a chipping hammer to do work that a gang of five men couldn't do as well by hand.

Curtis Provides Air Pressure at Low Cost

"Running every working day for eight hours, our entire compressed air cost is only $3.33 a day. This includes 20% depreciation, interest on our investment, incidentals and cost of electric power at our comparatively high rate of 3c per K.W.H.

"Purchased in February, 1934, during seven months' operation in our foundry, it hasn't been touched except for oiling.

"This equipment of such reliable design and make certainly fills every need."

In every type of industry, Curtis Compressors have the reputation for dependability, efficiency and ability to deliver compressed air at low cost, with important savings in time and labor. Made by a company that has specialized in compressor building for over 81 years.

*A complete report by Mr. Placke will be of vital interest to production executives. Write for your copy today.

Curtis Features

Carbon-Free Valves — Timken Bearings
Cooled Air Intake — Centro-Ring Oiling

Curtis Pneumatic Machinery Co., 1917 Kienlen Avenue, St. Louis, Mo.; — New York City — Chicago — San Francisco

CURTIS COMPRESSORS—AIR HOISTS—I-BEAM CRANES and TROLLEYS

AUTOMOTIVE ABSTRACTS

(*Continued from page* 767)

temperature 806 deg. F. An absolute maximum of 45 per cent above rated output was obtained, but the exhaust was then smoky, the b.m.e.p. was 115.8 lb. per sq. in., the fuel consumption 0.462 lb. per b. hp-hr., and the exhaust-manifold temperature, 1112 deg. F.

At 1500 r.p.m. the fluid and frictional losses were equal to 28 lb. per sq. in. mean piston pressure. Thus at full load of 60 b. hp. the i.m.e.p. was 108 lb. per sq. in., and the rate of fuel consumption was found to be 0.295 lb. per i. hp-hr. and 0.397 lb. per b. hp-hr. At this speed the engine also developed 25 per cent above its rated power with clear exhaust, and 35.8 per cent above its rated power with black exhaust.—*Engineering*, April 5.

Chilled Cast Iron Tappets

VALVE tappets made of steel sometimes are a source of trouble. They have therefore been replaced by tappets of chilled cast iron which have given complete satisfaction in use. Their use has become general during the past several years. Several different types have been adopted.

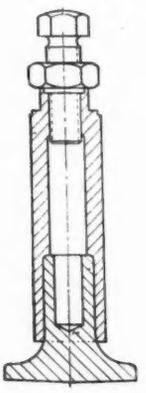


Fig. 1

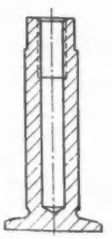


Fig. 2

Fig. 3

Fig. 1 shows a tappet consisting of two parts, a cast iron foot *A* and a steel part *B* which is forced over and brazed to *A*. The tappet shown in Fig. 2 is made completely of cast iron. In each case the surface subjected to frictional wear is quenched immediately after pouring. The cross-hatched section on Fig. 3 is completely converted into white iron. Its hardness is between 50 and 54 Rockwell, which corresponds to 480-530 Brinell. In service, cast iron chilled tappets have proven superior to the best steel tappets.—From a paper, "Cast Iron Founding in the Automobile Industry," by Francois Thivot, printed in the December issue of the Journal of the French Society of Automobile Engineers.

Correction

The piston displacement of the Imperia motorcycle referred to in an abstract in the May 4 issue should obviously have been 350 cu. cm. instead of 350 cu. in.